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RECOMMENDATIONS OF THE GALVESTON BAY ENFORCEMENT CONFERENCE

Environmental Protection Agency
Washington, D. C.

October 1972

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PROGRESS REPORT
ON
RECOMMENDATIONS
OF THE

GALVESTON
BAY ENFORCEMENT
CONFERENCE

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U S Department of Commerce
Springfield VA 22151

BY

GALVESTON BAY TECHNICAL COMMITTEE

TEXAS WATER QUALITY BOARD

AND

ENVIRONMENTAL PROTECTION AGENCY

October 1972

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I

INTRODUCTION

The Galveston Bay Technical Committee was formed by the Conferees' of the Galveston Bay Enforcement Conference at the conclusion of the first session in June 1971. The Technical Committee summarized testimony offered at the first session and the Conferees adopted recommendations at the second session in November 1971. Many of these recommendations require periodic submittal of progress reports prior to the time of full implementation. In accordance with these recommendations, the Galveston Bay Technical Committee submits this first progress report.

Recommendations Number 4, 5 and 11 concerned adequate criteria and sampling of shellfish harvesting areas to insure acceptability of the product for consumption. The Food and Drug Administration has initiated a nationwide sampling and analysis program to determine the toxicological significance of oil and hydrocarbon residues in oysters. Preliminary data from this survey are not yet available for general distribution. The Texas State Board of Health and the Food and Drug Administration have amended the sampling schedule in Galveston Bay to include, as far as possible, data collection under the most unfavorable hydrographic and pollution conditions. Alert levels proposed for heavy metal concentrations in shellfish at the Food and Drug Administration Seventh National Shellfish Sanitation Workshop were not adopted. A committee has been formed to study the problem and review available data at yearly intervals.

Recommendation No. 6 concerned effective disinfection of municipal effluents and the centralization of sewage treatment plants. Grab

samples of efffluents from 50 major municipal waste plants collected by the Texas Water Quality Board in March 1972, indicated that a large number of the plants were meeting the Texas Water Quality Board chlorine residual requirements. However, total and fecal coliform concentrations in the effluents of many plants were still excessive. Total and fecal coliform are indicators of the possible presence of pathogenic organisms. In general, those plants with larger contact times discharged effluent with satisfactory bacteriological quality. In general, the unsatisfactory bacteriological densities are related to either excessive solids concentrations in the effluent, or short circuiting in the chlorine contact tank, or both. Correction of the problem is being pursued on a case by case basis by the Texas Water Quality Board. The Sims Bayou plant of the City of Houston is the only major municipal waste source without chlorination facilities. These facilities will be constructed and in operation by December 1972.

With respect to the centralization of sewage treatment plants and the elimination of small facilities, the Texas Water Quality Board has issued an order to the City of Houston requiring the abandonment of a number of obsolete plants and the diversion of these wastes to regional and sub-regional systems. The Clear Lake area has also received a Texas Water Quality Board order with the same objective. Compliance with these Texas Water Quality Board orders is mandated before December 31, 1974.

Recommendation No. 7 called for a joint waste source survey of the Galveston Bay area by the Environmental Protection Agency and the Texas Water Quality Board, in addition to other ongoing studies. This survey

commenced during April 1972. It is presently anticipated that approximately one-half the waste effluent flow to the Houston Ship Channel will have been analyzed by October 1972. Results will be provided to the Conferees as soon as they become available.

Recommendation No. 8 called for the requirement of best reasonable available treatment to minimize discharges of oil and grease. Texas Water Quality Board permits are being amended to require oil and grease concentrations in waste effluent to be not greater than 10 ppm.

Recommendation No. 9 called for a continuing reduction of waste loads and amendment of Texas Water Quality Board permits to reflect these reductions. Under present abatement schedules, the waste load to the Houston Ship Channel will be reduced to about 60,000 pounds per day of biochemical oxygen demand (BOD) by December 1973, from the present 100,000 pounds per day. The major waste sources in the Texas City area will be reduced from the present 78,000 pounds per day to 13,800 pounds per day in 1974 to 11,800 pounds per day in 1976.

Recommendation No. 10 called for an evaluation of the organic sludge problem in the Houston Ship Channel with specific emphasis on the development of suitable dredged spoil disposal areas. Examination of bottom deposits by Texas A&M University showed highly organic material and represents an important pollutional source. Some analyses indicate that the Channel deposits contain material toxic or inhibitory to microorganisms. EPA and the U. S. Army Corps of Engineers have proposed the construction of a ringed diked spoil area on Atkinson Island. Further studies of the environmental impact of this proposal are advisable.

Recommendation No. 12 required an assessment of feasible processes to accomplish color removal from waste sources. The Committee decided that, although several ongoing research studies on color removal indicated promising results, the technology was still not sufficiently developed to require color removal processes be installed at the present time. The Texas Water Quality Board permits do specify that such processes will be installed when technological feasibility for general use is demonstrated.

Recommendation No. 13 states that: "To meet present official State-Federal water quality standards established for dissolved oxygen in the Houston Ship Channel, it is expected that the maximum waste load discharged from all sources will be about 35,000 pounds per day of five-day BOD, including projected future development. The Texas Water Quality Board in cooperation with technical personnel of the EPA shall review existing waste discharge orders with the objective of allocating allowable five-day BOD waste loads for sources discharging to the Houston Ship Channel such that the probable 35,000 pounds per day maximum shall not be exceeded." Such an allocation was made by the Technical Committee and presented in a public hearing by the Texas Water Quality Board in Baytown, Texas in February 1972. Major opposition to these allocations was voiced at this hearing. The Texas Water Quality Board is conducting an abatement program that will attain a total B.O.D. effluent level of approximately 60,000 pounds per day by December 1973. During this period, consultations will be held between the Texas Water Quality Board and the Environmental Protection Agency with individual waste dischargers to determine specific implementation dates by these

waste sources for meeting Federal-State water quality standards for the Houston Ship Channel. The present program of limiting effluents to 60,000 pounds per day is an interim step and may not meet presently approved State-Federal water quality standards for dissolved oxygen in the Houston Ship Channel.

Recommendation No. 14 directs an allocation of allowable waste loads to Galveston Bay and all other tributary areas. The Clear Lake area has received a Texas Water Quality Board order requiring the abandonment of obsolete plants and the diversion of these wastes to regional and sub-regional systems. The major waste sources in the Texas City area will be reduced from the present 78,000 pounds per day to 13,800 pounds per day in 1974 to 11,800 pounds per day in 1976. The City of Galveston has been directed by a Texas Water Quality Board order to make extensive improvements in the collection system and to provide expanded treatment facilities by December 31, 1974.

Representatives of the Galveston Bay Technical Committee are:

Texas Water Quality Board:

Joe Teller - Formerly Deputy Director*

Dick Whittington - Director, Field Operations

Robert Fleming - Director, Central Operations

Environmental Protection Agency:

Thomas Harrison - Region VI, Dallas, Texas

Malcolm Kallus - Region VI, Dallas, Texas

Thomas P. Gallagher - National Field Investigations Center-Denver, Colorado

* - Mr. Tellers' position on the Technical Committee has been assumed by Mr. Tim Morris Chief, Field Support Section, Field Operations Division of the Texas Water Quality Board.

II
SUMMARY OF CONFERENCE
(FIRST SESSION)
POLLUTION OF THE NAVIGABLE WATERS
OF
GALVESTON BAY AND ITS TRIBUTARIES

June 7-12 and November 2-3, 1971

The Administrator of the Environmental Protection Agency, in accordance with section 10 of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1160), and his finding that substantial economic injury results from the inability to market shellfish or shellfish products in interstate commerce because of pollution, and the action of Federal, State, or local authorities, on April 13, 1971, called a conference in the matter of pollution of the navigable waters of Galveston Bay and its tributaries (Texas). The conference was held June 7-12, 1971, at the Rice Hotel, Houston, Texas, and reconvened on November 2-3, 1971, at the Shamrock Hilton Hotel, Houston, Texas.

Galveston Bay is located in southeastern Texas on the Gulf of Mexico about 25 miles southeast of Houston, the largest city in the State. The Galveston Bay estuarine system, consisting of four large bays, Galveston, Trinity, East, and West Bays, and numerous smaller bays, creeks and bayous, has a total surface area of about 533 square

miles and is the largest estuary on the Texas coast. The combined shoreline totals 245 miles.

The following conferees representing the State water pollution control agency and the Environmental Protection Agency participated in the conference:

TEXAS

Hugh C. Yantis, Jr.	Executive Director Texas Water Quality Board Austin, Texas

ENVIRONMENTAL PROTECTION AGENCY

Richard A. Vanderhoof	Director, Enforcement Division Region VI Environmental Protection Agency Dallas, Texas
Murray Stein, Chairman	Chief Enforcement Officer - Water Environmental Protection Agency Washington, D. C.

The Chairman of the conference pointed out that:

1. Under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1160), pollution of interstate or navigable waters which endangers the health or welfare of any persons is subject to abatement under procedures described in section 10 of the Federal Act.

2. Under the provisions of section 10 of the Act, the Administrator of the Environmental Protection Agency is authorized to initiate enforcement procedures when he finds that substantial economic injury results from the inability to market shellfish or shellfish products in interstate commerce because of pollution subject to abatement under the Act, and action of Federal, State, or local authorities.

3. The first step of these procedures is the calling of a conference.

4. The purpose of this conference is to bring together representatives of the State water pollution control agency and the Environmental Protection Agency to review the existing situation and the progress which has been made, to lay a basis for future action by all parties concerned, and to give the State, localities, and industries an opportunity to take any indicated remedial action under State and local law.

In light of conference discussions, the following conclusions and recommendations were reached by the conferees:

1. The Federal conferee concluded that there is occurrence of pollution of interstate or navigable waters due to discharges from municipal and industrial sources subject to abatement under the Federal Act.

The State conferee took the position that the conference was called under the shellfish provisions of the Act and that while there is pollution occurring in the waters covered by the conference, it has not been demonstrated that substantial economic injury results from the inability to market shellfish products in interstate commerce.

2. While measures have been taken to reduce such pollution, they are not yet adequate.

3. Delays encountered in abating the pollution have been caused by the enormity and complexity of the problem.

4. The Food and Drug Administration, in cooperation with appropriate State regulatory agencies, will continue its recently initiated national study of oil and hydrocarbon residues in oysters, including those taken from Galveston Bay, with the objective of determining toxicological effects, if any, of such concentrations. These data, and any evaluations, will be made available to the conferees of the Galveston Bay enforcement conference.

5. To insure that approved shellfish harvesting areas are properly classified at all times, sampling for determining bacteriological acceptability of areas for shellfish harvesting in Galveston Bay shall continue to emphasize the most unfavorable hydrographic and pollution conditions. The most unfavorable hydrographic and pollution conditions will be determined by technical personnel of the Texas State Health Department, in cooperation with the Food and Drug Administration and other Federal and State and local agencies.

6. Effective disinfection of all waste sources contributing bacteriological pollution to the Galveston Bay system will be provided. The Texas Water Quality Board policy to this effect shall continue to be implemented. Where effective disinfection is not presently being accomplished, it is recognized that adequate measures are underway

to secure that disinfection. These measures shall be effective by December 31, 1971.

The Texas Water Quality Board will continue to implement its policy requiring the elimination of small plants. The centralization of facilities, wherever possible, and the halt of proliferation of small plants will continue, consistent with existing appropriate procedures. The implementation schedule for this program, as initiated by the Texas Water Quality Board, will be made available to the conferees of the Galveston Bay enforcement conference not later than April 1, 1972.

7. The Environmental Protection Agency and the Texas Water Quality Board will cooperate in a study of Galveston Bay. This study is presently being conducted by the Texas Water Quality Board on all sources of municipal and industrial wastes permitted by the Texas Water Quality Board to discharge effluent to Galveston Bay and its tributaries. These examinations shall emphasize determination of complex organic compounds, heavy metals and other potentially toxic substances, as well as oil and grease, from each waste source. Recommendations and scheduling of necessary abatement will be provided to the conferees as soon as they become available. The Texas Water Quality Board permits and self-reporting data system will be amended, as necessary, to reflect the recommendations of this waste source survey. A progress report on results of this study will be made to the conferees within six months of the date of the reconvened session of the Galveston Bay enforcement conference.

8. The Texas Water Quality Board will continue its review of each waste source discharging to Galveston Bay and its tributaries, and will

amend those permits as necessary to insure that the best reasonable available treatment is provided relative to discharges of oil and grease. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment. It is recognized that improvements in technology will be incorporated into future permit revisions. A progress report will be made to the conferees within six months of the date of the reconvened session of the Galveston Bay enforcement conference.

9. The ongoing review and amendment by the Texas Water Quality Board of existing permits recognizes that greater reductions of waste will be required of waste dischargers to the Galveston Bay system to meet water quality standards. The conferees note that in the past three years the organic waste load being discharged into the Houston Ship Channel has been lowered from about 430,000 pounds per day of BOD to 103,000 pounds per day of BOD. Any amendments to existing or new Texas Water Quality Board waste control orders as a result of this program will prohibit dilution as a substitute for treatment. A progress report on continuing reduction of waste loads will be provided to the conferees within six months of the date of the reconvened session of the Galveston Bay enforcement conference.

10. A characterization and evaluation of the water quality significance of materials from pollution sources contained in the organic sludge dredged from the Houston Ship Channel shall be conducted. Based on the results of this evaluation and examination of present spoil disposal areas, recommendations will be made by the Texas Water Quality

Board and the Environmental Protection Agency on location of suitable spoil disposal areas and other appropriate action to minimize or eliminate deleterious effects on water quality.

11. If alert levels for acute and chronically toxic or growth inhibiting factors are developed by the Food and Drug Administration for shellfish from all approved national growing waters, including Galveston Bay, the appropriate Texas agencies and the Environmental Protection Agency, in cooperation with the Food and Drug Administration and other appropriate Federal agencies will work to develop requirements for the same characteristics in waters approved for shellfish harvesting.

12. Chemical constituents causing color in waste effluents, such as those from pulp and paper mills, shall be reduced to natural background in area waters as soon as practicable as stated in existing Texas Water Quality Board waste control orders. A report on feasible processes to accomplish this recommendation shall be submitted to the conferees within six months of the reconvened session of the Galveston Bay enforcement conference.

13. [To meet present official State-Federal water quality standards established for dissolved oxygen in the Houston Ship Channel, it is expected that the maximum waste load discharged from all sources will be about 35,000 pounds per day of five-day BOD, including projected future development. The Texas Water Quality Board in cooperation with technical personnel of the EPA shall review existing waste discharge orders with the objective of allocating allowable five-day BOD waste loads for sources

discharging to the Houston Ship Channel such that the probable 35,000 pounds per day maximum shall not be exceeded.] A report will be made to the conferees on the results of this review by April 1, 1972. The allocation for each waste source as determined by the Texas Water Quality Board, in cooperation with the EPA, shall be attained by December 31, 1974. Interim dates to determine progress toward compliance of the assigned allocation shall be established for each waste source by May 1, 1972.

The conferees also recognize that discharge of other waste constituents shall as, but not limited to, chemcial oxygen demand, suspended solids, complex organics, and other toxic materials also contribute to the pollution of Galveston Bay and its tributaries. An allocation of allowable waste discharges for these pertinent parameters from each waste source will be established by technical personnel of the Texas Water Quality Board and the EPA consistent with best available treatment practices and such allocation will be reported to the conferees by September 1, 1972.

The conferees recognize that technical considerations may require a reassessment of this schedule in the case of some of the municipal and industrial waste sources to be considered. These necessary reassessments will be determined by technical personnel of the Texas Water Quality Board and the EPA, and recommendations concerning schedule changes will be made to the conferees at six month intervals.

The foregoing recommendations shall not be construed as in any way foreclosing or interfering with Federal, State or local statutory proceedings relating to the authorization, amendment, or revocation of

Federal or State waste discharge permits or orders, nor shall such recommendations operate to delay or prevent the creation or operation of regional waste disposal systems such as the contemplated Gulf Coast Waste Disposal Authority.

14. All waste sources which discharge directly to Calveston Bay and other tributary areas, including Clear Lake, shall have allowable waste loads allocated by June 30, 1972, consistent with best available treatment practices. This allocation shall include interim dates for accomplishment of required waste treatment and/or waste treatment facilities which will be in operation by December 31, 1974. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment.

15. The following recommendation was not susceptible to joint agreement by the conferees:

Re: Houston Lighting and Power Cedar Bayou Power Plant

(a) The Texas conferee's recommendation-- the once through cooling system, with discharge to Trinity Bay, proposed for the Cedar Bayou plant shall be carefully monitored to determine whether damage to aquatic life is occurring and/or water quality is being deleteriously affected. If such effects are shown, Houston Lighting and Power Company will take immediate steps to correct the situation.

(b) The Federal conferee's recommendation--no discharge of cooling water from the Cedar Bayou plant to Trinity Bay

shall be permitted. The Houston Lighting and Power Company shall be required to abate the waste heat load by incorporation of a system utilizing recirculation and reuse of cooling water to Tabbs Bay and adjacent waters or location of additional units at suitable alternative sites.

III

SHELLFISH RECOMMENDATIONS

1. Recommendations

The Food and Drug Administration, in cooperation with appropriate State regulatory agencies, will continue its recently initiated national study of oil and hydrocarbon residues in oysters, including those taken from Galveston Bay, with the objective of determining toxicological effects, if any, of such concentrations. These data, and any evaluations, will be made available to the Conferees of the Galveston Bay Enforcement Conference.

To insure that approved shellfish harvesting areas are properly classified at all times, sampling for determining bacteriological acceptability of areas for shellfish harvesting in Galveston Bay shall continue to emphasize the most unfavorable hydrographic and pollution conditions. The most unfavorable hydrographic and pollution conditions will be determined by technical personnel of the Texas State Health Department, in cooperation with the Food and Drug Administration and other Federal and State and local agencies.

If alert levels for acute and chronically toxic or growth inhibiting factors are developed by the Food and Drug Administration for shellfish from all approved national growing waters, including Galveston Bay, the appropriate Texas agencies and the Environmental Protection Agency, in cooperation with the Food and Drug Administration and other appropriate Federal agencies will work to develop requirements for the same characteristics in waters approved for shellfish harvesting.

2. Discussion

During the summer of 1971, the Food and Drug Administration initiated a nationwide survey of oil and hydrocarbon residues in oysters to determine possible toxicological significance of these concentrations. The Texas State Department of Health has collected oyster meat samples from Galveston Bay for analysis by the FDA laboratory in Dallas, Texas. Plans are underway to establish two permanent sampling stations in Galveston Bay for quarterly analysis of oil and hydrocarbon residues. Preliminary results of the initial sampling have not yet been made available by the FDA for general distribution. The study is continuing.

After reviewing available historical sampling data, the FDA, in cooperation with the Texas State Department of Health has placed increased emphasis on regulating shellfish and water sampling under the most unfavorable hydrographic and pollution conditions to insure that shellfish harvesting areas are properly classified from a bacteriological standpoint. The sample collection schedule has been adjusted to more clearly reflect these conditions. To carry out these new procedures, additional personnel have been hired.

At the Seventh National Shellfish Sanitation Workshop conducted by FDA in Washington, D. C., on October 20-22, 1971, the consensus of opinion was, that while there is a need for some form of alert levels for heavy metals, it would not be practical to publish any official numerical levels for metals in shellfish at this time. The proposed levels which were rejected are shown in Table III-1.

The National Shellfish Sanitation Program acting upon the decision of the Workshop to establish a permanent Chemistry Task Force, has

CHEMISTRY TASK FORCE

TABLE III-1

1. Proposed Alert Levels be Established for the Following Metals in the Species and Areas Indicated:

Metal	Species	Area	Interim Alert Level *
Cadmium	Oyster	Northeast	3.5 ppm
Cadmium	Oyster	Southern	1.5 ppm
Cadmium	Hard Clam	Northern & Southern	0.5 ppm
Cadmium	Soft Clam	Northern & Southern	0.5 ppm
Lead	Oyster	Northern & Southern	2.0 ppm
Lead	Hard Clam	" "	4.0 ppm
Lead	Soft Clam	" "	5.0 ppm
Chromium	Oysters	" "	2.0 ppm
Chromium	Hard Clam	" "	1.0 ppm
Chromium	Soft Clam	" "	5.0 ppm
Zinc	Oysters	Northeast	2,000 ppm
Zinc	Oysters	Southern	1,000 ppm
Zinc	Hard Clam	Northern & Southern	65 ppm
Zinc	Soft Clam	" "	30 ppm
Zinc	Surf Clam	" "	20 ppm
Copper	Oysters	Northeast	175 ppm
Copper	Oysters	Southern	42 ppm
Copper	Hard Clam	Northern & Southern	10 ppm
Copper	Soft Clam	" "	25 ppm
Copper	Surf Clam	" "	5 ppm
Mercury	Oysters	" "	0.2 ppm
Mercury	Hard Clam	" "	0.2 ppm
Mercury	Soft Clams	" "	0.2 ppm

* Drained Wet Meats

Workshop Action

After much discussion on the proposal, the consensus of opinion was that while there is a need for some form of levels for heavy metals, it would not be practical from an industrial viewpoint, to publish any official numerical levels for metals in shellfish at this time. (This statement is taken verbatim from the FDA Synopsis of Workshop - Seventh National Shellfish Sanitation Workshop.)

appointed a tentative committee consisting of members of FDA, EPA, Virginia Institute of Marine Sciences, the States, the industry and the academic community. This group will have authority to set such alert levels for heavy metals, pesticides, oil and hydrocarbons, etc., as additional data and information collected indicate.

IV

A. DISINFECTION OF WASTE SOURCES

1. Recommendation

Effective disinfection of all waste sources contributing bacteriological pollution to the Galveston Bay system will be provided. The Texas Water Quality Board policy to this effect shall continue to be implemented. Where effective disinfection is not presently being accomplished, it is recognized that adequate measures are underway to secure that disinfection. These measures shall be in effect by December 31, 1971.

2. Discussion

A review of the chlorine residual data obtained from the Texas Water Quality Board self-reporting system showed most plants to be in compliance with the disinfection criterion of 1.0 ppm chlorine residual after a 20-minute contact time. Those plants not meeting this criterion were sent a letter requiring compliance by December 31, 1971. In addition, total and fecal coliform results were not satisfactory at some sources where the chlorine residual criterion is being met. See Table IV-1. If a facility was unable to meet the December deadline due to inoperative or inadequate equipment, the Texas Water Quality Board was to be notified by letter of the reason for not complying, the corrective procedures proposed, and the time schedule for placing disinfection facilities into operation.

Because major construction was required, some plants were unable to meet the December 31 deadline. One large plant operated by the City of

TABLE IV-1

MUNICIPAL WASTE DISCHARGES INTO HOUSTON SHIP CHANNEL AND GALVESTON BAY

SOURCE	FLOW MGD	CONTACT TIME MIN	CHLORINE RESIDUAL MG/L	COLIFORM (MPN) TOTAL	COLIFORM (MPN) FECAL	REMARKS
Alvin, City of	1.9	15.7	1.1	28,000	≤2,400	Two baffles
Bacliff MUD	0.25	25.8	1.3	460,000	460,000	No baffles
Baytown - West Main	0.864	44	3.0+	11,000	2,400	Air mixing
Baytown - Bayway	0.612	65	0.4	460,000	460,000	Clarifier
Baytown - East District	1.1	22.8	1.3	11,000	11,000	Air mixing
Bellaire, City of	2.3	13.2	3.0+	95	15	26 baffles
Cleveland, City of	0.2	67.6	0.0	460,000	460,000	Out of order
Conroe, City of	1.9	19.3	0.9	460,000	460,000	One baffle
Dayton - Northeast Plant	0.2	52.1	3.0+	≤23	≤23	Air mixing
Dayton - Southeast Plant	0.24	37.4	2.8	1,100	460	Three baffles
Friendswood - Plant No. 1	0.2	10.8	1.3	1,100	1,100	Two baffles
Galveston - Airport	0.9	29.8	1.5	23	4	Two baffles
Galveston - Main Plant	8.5	15.6	1.2	≥2.4 x 10^6	≥2.4 x 10^6	Two baffles
Galveston - Teichman	0.033	100	1.2	23	23	One baffle
Galveston Co. WCID #1	0.5	41.7	3.0+	750	750	Clarifier
Galveston Co. WCID #12	0.23	8.4	0	46 x 10^6	24 x 10^6	Out of order
Harris Co. WCID #55	0.95	30.6	1.2	24,000	24,000	Four baffles
Houston, City of						
Northside	65	7.5	0	110 x 10^6	46 x 10^6	
Sims Bayou	37	0	0	2.4 x 10^6	2.4 x 10^6	No facilities
Chocolate Bayou	1.5	0	0	11 x 10^6	11 x 10^6	No chamber
Clinton Park Plant	0.38	37.4	2.3	1,100	460	No baffles
FWSD #23	1.1	28.3	1.5	11,000	4,000	Three baffles
West District	9.0	15.9	1.0	640,000	640,000	One baffle
Southwest	24.0	30.7	0.9	90	90	
WCID #47	1.6	57.4	2.4	0	0	One baffle
WCID #51	1.5	20.6	3.0	240,000	240,000	Three baffles
Northwest	4.5	26.0	1.0	460,000	150,000	Three baffles

TABLE IV-1 (Cont'd)

SOURCE	FLOW MGD	CONTACT TIME MIN	CHLORINE RESIDUAL MG/L	COLIFORM (MPN) TOTAL	COLIFORM (MPN) FECAL	REMARKS
La Marque, City of	1.5	10.3	1.7	225,000	150,000	One baffle
League City						
Main Plant	0.6	17.8	3.0+	93	93	
Glen Cove	0.105	27.6	2.8	9	4	No baffles
Liberty - Main	0.35	36.2	1.4	110,000	110,000	One baffle
- Treetop	0.022	unknown	0	11×10^6	11×10^6	Out of order
Mount Belview	0.079	36.2	0.6	$\geq$240,000	46,000	Four baffles
Montgomery Co.						
FWSD #2	0.1	672	0	240,000	240,000	Four baffles
New Caney ISD	0.024	82	0	93,000	93,000	One baffle
- Porter Elementary	0.014	563	0	11×10^6	4.6×10^6	Clarifier
Pasadena						
Northside West 1A	1.98	242	0.5	150	150	Clarifier
Deepwater	1.8	393	1.6	1,500	1,500	Clarifier + contact chamber
Plant #3	1.4	0	2.0	460,000	460,000	2 mile 36-in. line past sample point
Northside East 1B	1.98	108	2.1	240	240	Clarifier
Saconas, George	0.03	6.2	0.1	460,000	240,000	No baffles
South Houston	0.15	814	0.0	46×10^6	46×10^6	One baffle
Stuckey, Doyle	0.023	4.5	0.5	2.4×10^6	2.4×10^6	One baffie
Texas City - Main Plant	2.6	65	3.0+	150	43	Ten baffles
- Plant #2	0.8	22.6	2.8	15	9	13 baffles
West University	1.08	62	3.0+	23	23	Six baffles

Houston, Sims Bayou, was known to have no chlorination facilities. The Texas Water Quality Board, in participating in the development of the Conference recommendations, agreed that all plants would have adequate disinfection equipment in operation by December 31, 1971, with the exception of the City of Houston Sims Bayou plant.

The schedule for completing the new facility at the Sims Bayou plant along with improvements at other Houston plants, is given in Board Order 71-0819-1 and the addendum to that Order. Refer to Attachment No. 1

Grab samples were collected and analyzed by Texas Water Quality Board personnel at 50 major municipal plants in the Conference area. This study was conducted to determine the reliability of existing chlorination facilities and the effect of chlorination on the municipal effluents. The survey took place from March 27 through March 29, 1972. Only those plants discharging directly into Galveston Bay or into the Bay's tributaries were sampled. Sampling and testing were done in accordance with Standard Methods. The chlorine residual was measured by the orthotolidine method utilizing the Hach Chlorine Test Kit. Four samples were lost during transportation or analysis.

The results of the survey are as follows:

1. Forty-nine of the fifty plants sampled have chlorination facilities.
2. One chlorinator was out of order.
3. The chlorination facility at the Sims Bayou plant, City of Houston, is under construction and will be in operation by December 31, 1972.

4. The Texas Water Quality Board will continue to enforce regulations for effective disinfection and where disinfection is found to be ineffective, the problem will be pursued until it is adequate. In support of the program, the City of Houston Health Department will expand its bacteriological surveillance of waters within its territorial jurisdiction. These data will be forwarded to the Texas Water Quality Board and the City of Houston sewer department for appropriate action.

B. CENTRALIZATION OF TREATMENT FACILITIES

1. Recommendation

The Texas Water Quality Board will continue to implement its policy requiring the elimination of small plants. The centralization of facilities, wherever possible, and the halt of proliferation of small plants will continue, consistent with existing appropriate procedures. The implementation schedule for this program, as initiated by the Texas Water Quality Board, will be made available to the Conferees of the Galveston Bay Enforcement Conference not later than April 1, 1972.

2. Discussion

This policy calls for the development of regional systems and the abandonment of outdated facilities where and whenever practical. Applications for new plants have been denied when the possibility of a tie-in to an existing system exists. This will continue to be a State-wide policy of the Texas Water Quality Board.

In accordance with this approach, Board Order 71-0819-1 (Attachment 1) requires the City of Houston to abandon a number of obsolete plants and to divert these wastes to regional and subregional plants. The

implementation dates for these diversions are included in Attachment 1). Completion dates will fall before December 31, 1974. Firm commitments for the abandonment of obsolete or unnecessary plants and for the development of regional plants have been established as a result of the Clear Lake Board Order, 69-9A. (Attachment 2)

Attachment No. 3 is a tabulation of sewage plants affected by the proposed Houston-Galveston area regional plan. This plan was prepared for the Houston-Galveston Area Council as a long range concept to be modified as population growth dictates. The tabulation includes those plants whose roles in regionalization are firmly established by Board Order Nos. 69-9A and 71-0819-1.

V

GALVESTON BAY WASTE SOURCE SURVEY

1. Recommendation

The EPA and the Texas Water Quality Board will cooperate in a study of Galveston Bay. This study is presently being conducted by the Texas Water Quality Board on all sources of municipal and industrial wastes permitted by the Texas Water Quality Board to discharge effluent to Galveston Bay and its tributaries. These examinations shall emphasize determination of complex organic compounds, heavy metals and other potentially toxic substances, as well as oil and grease, from each waste source. Recommendations and scheduling of necessary abatement will be provided to the Conferees as soon as they become available. The Texas Water Quality Board permits and self-reporting data system will be amended, as necessary, to reflect the recommendations of this waste source survey. A progress report on results of this study will be made

to the Conferees within six months of the date of the reconvened session of the Galveston Bay Enforcement Conference.

2. Discussion

The joint EPA-Texas Water Quality Board waste source survey commenced on April 17, 1972. The purpose of the survey is to develop information on waste constituents other than biochemical oxygen demand such that an allocation of the constituents among individual waste dischargers consistent with best available treatment practices as detailed in Recommendation 13. It is presently estimated that approximately one-half the effluent waste flow to the Houston Ship Channel will have been sampled and analyzed by **October** 1972. Results of these evaluations will be provided to the Conferees as soon as they become available.

VI

OIL AND GREASE REMOVAL

1. Recommendation

The Texas Water Quality Board will continue its review of each waste source discharging to Galveston Bay and its tributaries, and will amend those permits as necessary to insure that the best reasonable available treatment is provided relative to discharges of oil and grease. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment. It is recognized that improvements in technology will be incorporated into future permit revisions. A progress report will be made to the Conferees within six months of the date of the reconvened session of the Galveston Bay Enforcement Conference.

2. Discussion

The most effective process for the removal of oil and grease from an aqueous waste is gravity separation followed by biological treatment. Efficiencies of removal greater than 99 percent can be expected. Removal by gravity separation alone is much less effective.

Based upon a review of the literature, the best reasonable available treatment for continuous flows of oily waste is gravity separation followed by aerobic biological treatment. This procedure will normally produce an effluent containing less than 10 mg/l of oil and grease as measured by the Soxhlet extraction method.

The traditional method of treatment of oil and grease wastewaters from industrial, business, and domestic sources has been gravity separation. This process gained popularity for a number of reasons, among which are recovery of valuable product or resource, ease of maintenance, and low capital and operating costs. However, the efficiency of the process is limited by the settling velocity of the oil globules and the degree of emulsification. Although the standard API separator is designed for 15 micron diameter globules, the literature indicates this design will remove only 84 percent of 120 to 150 micron diameter globules and considerably poorer performance is attained on oil particles smaller than this.

An improvement on the basic gravity separator which has proven effective is the installation of parallel plate baffles set at a 45° angle to the vertical. These may be upflow or downflow baffles or a combination of both. The principle involved which improves performance

is reduction of the required settling distance of the globules. Experimental results on this type unit have demonstrated removal of all globules larger than 90 microns, 93 percent of 60 to 90 microns and 80 percent of 30 to 60 microns.

Another process which has proven effective in a number of industrial applications is that of dissolved air floatation. This is fundamentally a secondary treatment process and should be preceded by a gravity separation unit to remove the easily separable solids. The process utilizes the formation of very small air bubbles caused by rapid decompression of the water and dissolution of the dissolved gases in the water. This process may involve drawing a vacuum on water saturated with air at atmospheric pressure or, the method commonly used, saturation of the water with air at several atmospheres pressure with bubble formation occurring on release to atmospheric pressure. Bubble formation occurs on particulate surfaces and additional suspended matter may be adsorbed on the air-water interface as the bubble rises to the surface. Coagulants may be introduced to the waste stream prior to air floatation to enhance the efficiency of the process. Reported effluent levels for dissolved air floatation plus chemical aids for coagulation are in the range of 5 to 25 mg/l while those for the floatation process alone are 25 to 100 mg/l.

Other candidate physical-chemical processes are chemical coagulation-flocculation, filtration, and heating. Although these processes are generally very effective in oil and grease removal, they are rarely if ever utilized exclusively for this purpose due to the comparatively high capital and operating costs.

Biological treatment of oily wastes has proven to be an effective means of treatment under certain conditions. Typically the concentrated oily waste streams are pretreated by gravity separation and the effluent blended with other waste streams prior to biological treatment.

Although investigators have demonstrated biological decomposition of hydrocarbons by aerobic systems, the primary mechanism of removal in an activated sludge system is believed to be adsorption of the oil onto the biological floc and subsequent removal by sedimentation and excess sludge wasting. However, if the oil loading is excessive, the settling characteristics of the sludge may be impaired, resulting in solids loss out of the sedimentation basin and plant upset. The limiting concentration for activated sludge processes is believed to be between 25 and 50 mg/l.

Trickling filters, while not as susceptible to upset, are also concentration limited and rely on the same basic principles as activated sludge for oil removal. The limiting concentration is that which is sufficient to coat the biological slime on the filter media thereby blocking oxygen transfer and substrate removal.

The magnitude of the oil and grease waste problem in Texas is indicated by a survey taken by the Texas Water Quality Board in 1971 on the industries located on the Houston Ship Channel and in the Baytown area. "Grab" or individual samples were taken from 18 industries comprising approximately 70 percent of the total oil and grease discharges authorized by the Texas Water Quality Board. The total computed daily oil and grease discharge for these 18 industries was 20,200 pounds; extrapolated for the

remainder of the authorized discharges, an estimate of 28,800 pounds per day was derived. The average concentration of the discharges varied between 16 and 25 ppm oil and grease.

The effects of oil and grease on estuarine systems has been the subject of a great deal of controversy and investigation in recent years. The issues were brought into focus by the wreck of the "Torrey Canyon" off the coast of England and more recently by the spill off the coast of California at Santa Barbara. Both of these incidents occurred near heavily populated beaches and resulted in bird and fish kills.

Studies of oily wastes discharges on receiving streams have indicated that a definite sequence of events follow introduction of oil emulsions into the stream. Oil globules from the emulsions were trapped in the biological material which agglomerated into a settleable floc and carried the oil down with it. The settled solids quickly became anaerobic after deposition during warm weather. The net result was a fairly rapid physical separation of the emulsified oil from the flowing water. Most of the oil was stored in sludge banks during low flow conditions.

It has been determined that mineral oil emulsions will degrade aerobically, at typical summer temperatures with 50 to 80 percent reduction per week. However, laboratory studies indicate little, if any, decomposition under anaerobic conditions.

In summary, it appears that gravity separation followed by biological treatment equivalent to activated sludge affords the best treatment for oily wastes with the least capital investment if a biological plant is required for other waste streams and the oil concentrations can be kept to acceptable levels for the biological system. Systems of this

type have been demonstrated to be 99+ percent effective in oil and grease removal.

Although effluent levels of below 5 ppm oil and grease have been reported with biological systems, the treatment efficiency fluctuations of biological systems with varying climate conditions and hydraulic loadings and the accuracy of the Soxhlet extraction method would indicate that 10 ppm may be a more reasonable goal. It is recommended that abatement facilities for process wastes containing oil and grease be installed and maintained such that the effluent will contain the minimum amount of oil and grease but in no case to exceed 10 ppm.

All new waste control orders for process discharges issued for industries discharging into the Houston Ship Channel will reflect this oil and grease policy. Existing waste control orders for process discharges will be amended to the new level when they are reviewed as the result of information obtained during the intensive waste source survey.

VII.

WASTE LOAD REDUCTION PROGRAM

1. Recommendation

The ongoing review and amendment by the Texas Water Quality Board of existing permits recognizes that greater reductions of waste will be required of waste dischargers to the Galveston Bay system to meet water quality standards. The Conferees note that in the past three years the organic waste load being discharged into the Houston Ship Channel has been lowered from about 430,000 pounds per day of BOD to 103,000 pounds per day of BOD. Any amendments to existing or new Texas Water Quality Board waste control orders as a result of this program will prohibit dilution as a substitute for treatment. A progress report on continuing reduction of

HOUSTON SHIP CHANNEL
B. O. D. LOADING

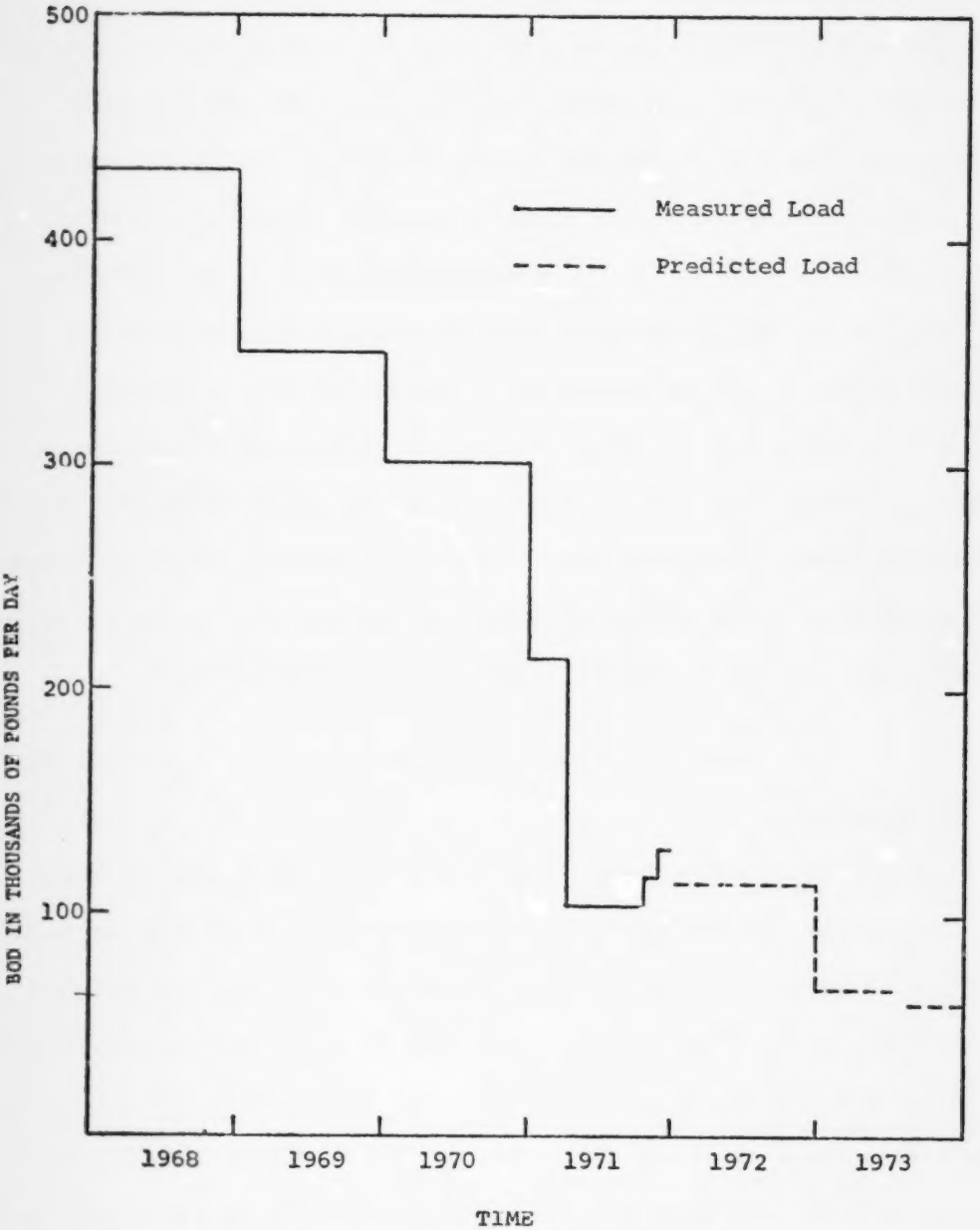

FIGURE VII-1

waste loads will be provided to the Conferees within six months of the date of the reconvened session of the Galveston Bay Enforcement Conference.

All waste sources which discharge directly to Galveston Bay and other tributary areas, including Clear Lake, shall have allowable waste loads allocated by June 30, 1972, consistent with best available treatment practices. This allocation shall include interim dates for accomplishment of required waste treatment and/or waste treatment facilities which will be in operation by December 31, 1974. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment.

2. Discussion

The major sources of pollution entering Galveston Bay are those industries and municipalities located along the Houston Ship Channel and in the Texas City area. Significant reductions of wastes discharging to the Houston Ship Channel have been accomplished since 1968.

Approximately 430,000 pounds of B.O.D. were being discharged daily into the Channel in 1968. This load had been reduced to approximately 100,000 pounds per day by the summer of 1971. Figure VII-1 represents the reduction of waste discharges to the Houston Ship Channel with respect to time. The figure indicates a slight increase in the load for November and December 1971, reflecting seasonal fluctuations as reflected by the Texas Water Quality Board self-reporting system.

A further reduction of approximately 6,000 pounds per day is expected with the projected completion of a communal treatment facility for five industries on the Channel. This planned facility will treat effluent

TOTAL B.O.D. CONTRIBUTED BY THE FOUR MAJOR
TEXAS CITY INDUSTRIES

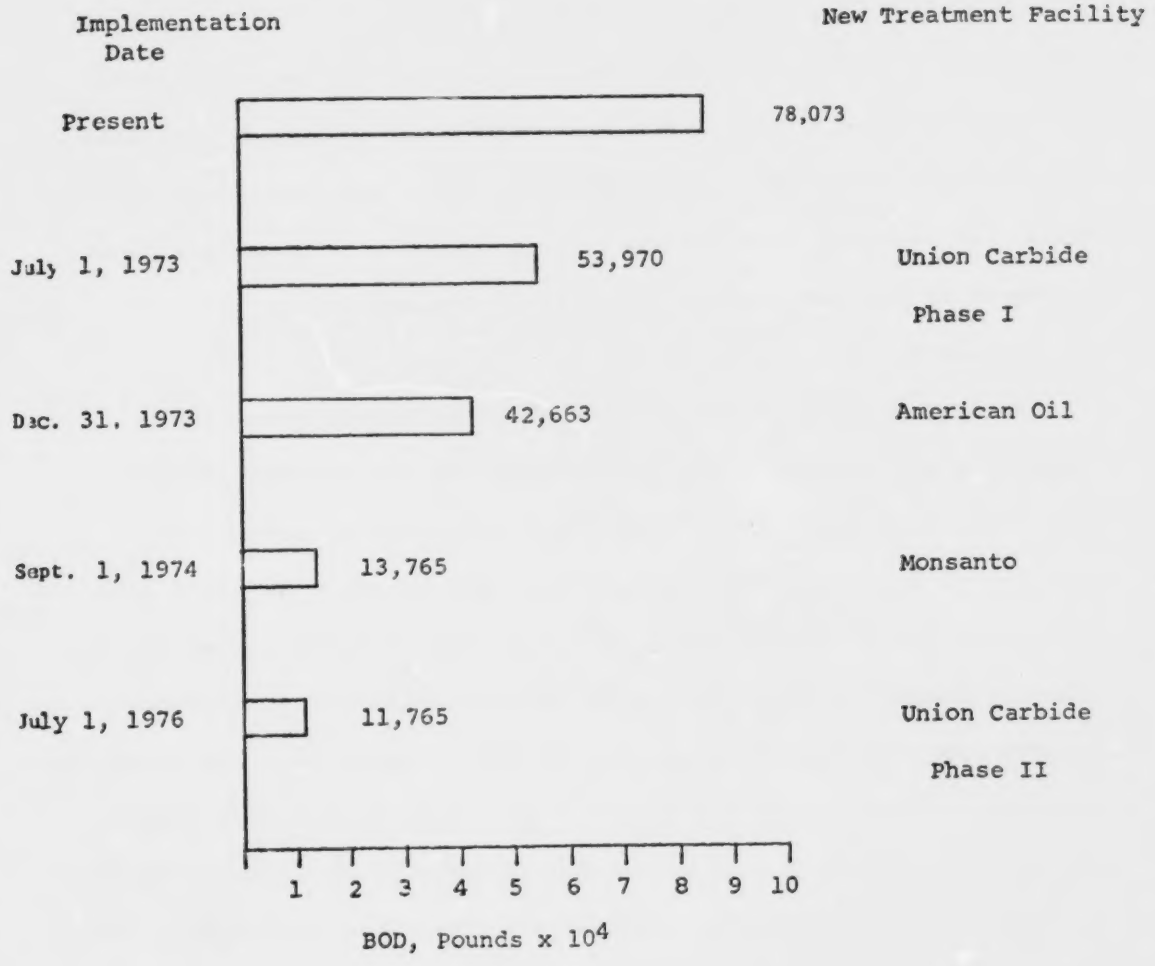

FIGURE VII-2

from Atlantic Richfield Company, Crown Central Petroleum Company, Petro Tex, Goodyear and U. S. Plywood - Champion Paper Company.

If all planned abatement facilities remain on schedule, B.O.D. discharges to the Houston Ship Channel will be reduced to approximately 60,000 pounds per day by December 1973.

Less progress has been made in reducing waste loads from the Texas City area. Four industries account for most of the B.O.D. discharged from the area. Table 1 lists the four major industries and their present discharge.

Table 1

Major Texas City Dischargers

Discharger	Flow (MGD)	BOD_5 (ppd)
Monsanto	56.0	24,428
Monsanto	19.5	2,487
Union Carbide	9.02	31,144
Union Carbide	0.90	5,817
Texas City Refinery	1.34	290
American Oil	15.44	13,907
TOTAL		78,073

Figure VII-2 illustrates the scheduled implementation of improved treatment at the four major plants.

VIII

ORGANIC SLUDGE DEPOSITS
DISPOSAL OF DREDGING SPOIL

1. Recommendation

A characterization and evaluation of the water quality significance of materials from pollution sources contained in the organic sludge dredged from the Houston Ship Channel shall be conducted. Based on the

results of this evaluation and examination of present spoil disposal areas, recommendations will be made by the Texas Water Quality Board and the Environmental Protection Agency on location of suitable spoil disposal areas and other appropriate action to minimize or eliminate deleterious effects on water quality.

2. Discussion

This report summarizes the analytical findings presented in Technical Report #8 - Estuarine Systems Project, Environmental Engineering Division, Texas A&M University. The study was funded by the following State and Federal agencies: Federal Water Pollution Control Administration, National Science Foundation, Texas Engineering Experiment Station, and Texas A&M University.

During the Spring of 1970, Texas A&M University conducted extensive field investigations of the quantity and quality of the benthal deposits contained in the Houston Ship Channel and its tributary bays. Analyses conducted on the sludge samples include volatile solids, BOD_5, COD, oil and grease. Samples were obtained from stations located along the entire channel length and from various points within the channel cross section. Core samples were also taken in three of the side bays.

Main Channel

Table VIII-1 gives a physical description of the sludge core samples taken at stations along the channel. The physical characteristics vary considerably. An interest trend is the increase in deposit thickness and the visible oil content above mile point 14.

Figure VIII-1 is a volatile solids profile of the deposits. The scattering of the data points at each station indicates the variation in volatile

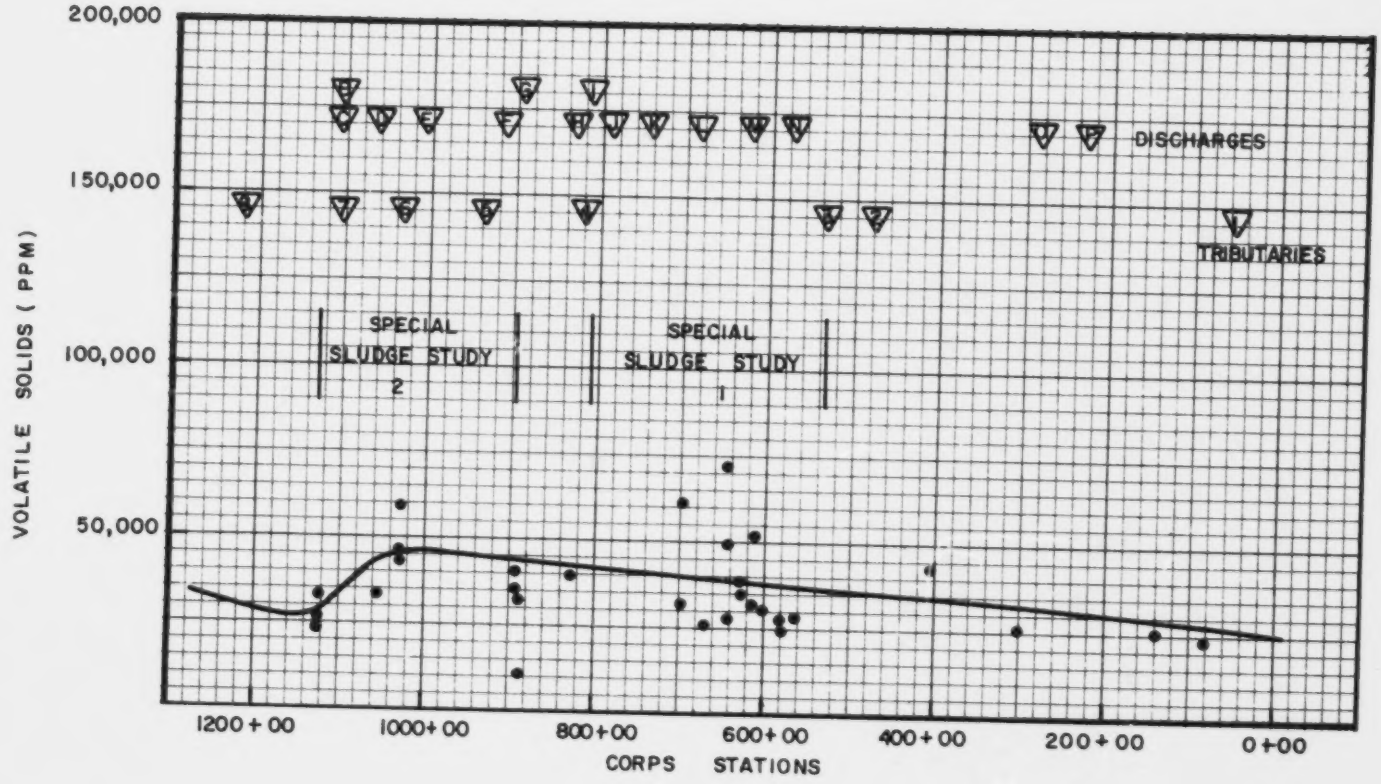

FIGURE VIII-1

VOLATILE SOLIDS PROFILE OF BOTTOM SLUDGES

TABLE VIII-1 Observations*

Sample Location (mile)	Depth of Sludge Core Collected in Sampler (ft.)	Description of Sludge and Underlying Material
0	3.5	Grayish Sludge Material on Red Clay Bottom
2	4.5	Black Sludge, No Underlying Material Picked Up by Sampler
4	1.6	Black Sludge on Gray Clay Bottom
6	No Sludge	Gray and Red Clay
8	1.5	Black Sludge on Gravel and Clay Bottom
10	.5	Dark Gray Sludge and Clay Material
12	2.5	Black Sludge on Clay Bottom
14	3.5	Black Sludge on Bed of Red Clay
16	3.0	Black, Oily Sludge on Bottom of Red Clay
18	3.5	Black Sludge on Red Clay Bottom
20	2.0	Black, Oily Sludge on Red Clay Bottom
22	3.0	Black Sludge on Red Clay Bottom
24	3.0	Black Sludge on Red Clay

solids content within a given cross section. The quality variation within a cross section is verified by analyses of the other parameters. Figure VIII-2 is a longitudinal profile of the percent volatile solids contained in the sludge. This is a steady increase in the percent volatile solids from Morgan's Point, mile point 0 (8%), to the Turning Basin, mile point 24 (11%).

Profiles of BOD_5 and COD, Figures VIII-3 & VIII-4 indicate a significant variation in the COD and to a lesser extent the BOD_5 of the benthal deposits. The COD of the sludge more than doubles above mile point 12. This finding should be expected because of the heavy concentration of municipal and industrial discharges above this point. The BOD_5 data shows a similar trend.

A very significant finding is the increase in BOD5 values with increased dilution of the samples. Several dilutions were made for each BOD analysis. As the percent of the sample in the BOD bottle decreased, i.e., an increase in dilution, the oxygen uptake increased. Not all of the samples displayed this phenomenon; however, enough did to make the finding significant. In some analyses, diluting the sample to one-fourth its initial concentration more than doubled the calculated BOD. The implication is that some of the benthal deposits contain toxic materials that reduce biological activity.

Figure VIII-5 shows a steady increase in the percent of oil and grease from Morgan's Point to the Turning Basin. The average oil and grease content of the sludges appears to be approximately 0.5 percent.

Side Bay Delta

Core samples were taken of the deposits in three side bays tributary to the Ship Channel. Scott, Burnett, and Upper San Jacinto bays

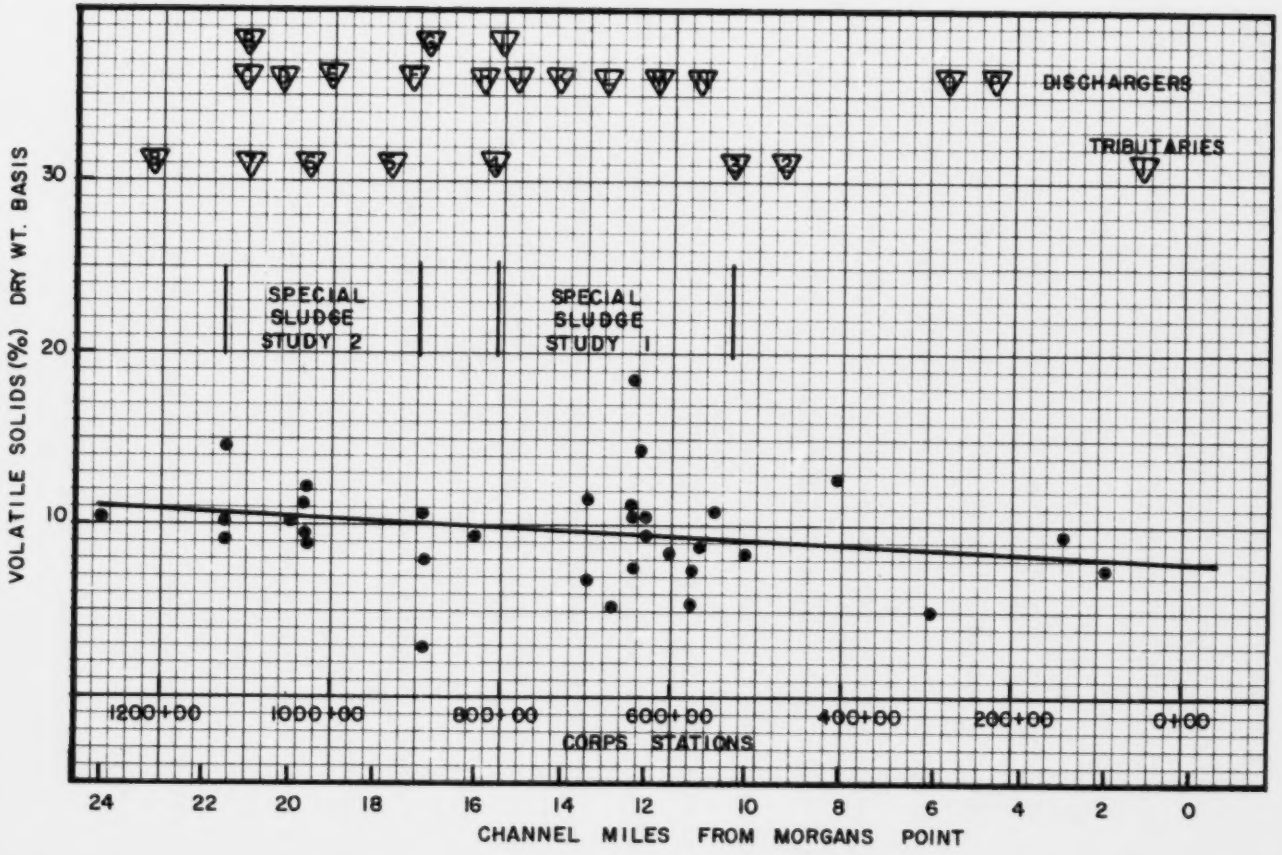

FIGURE VIII-2

VOLATILE SOLIDS (%) PROFILE OF BOTTOM SLUDGES

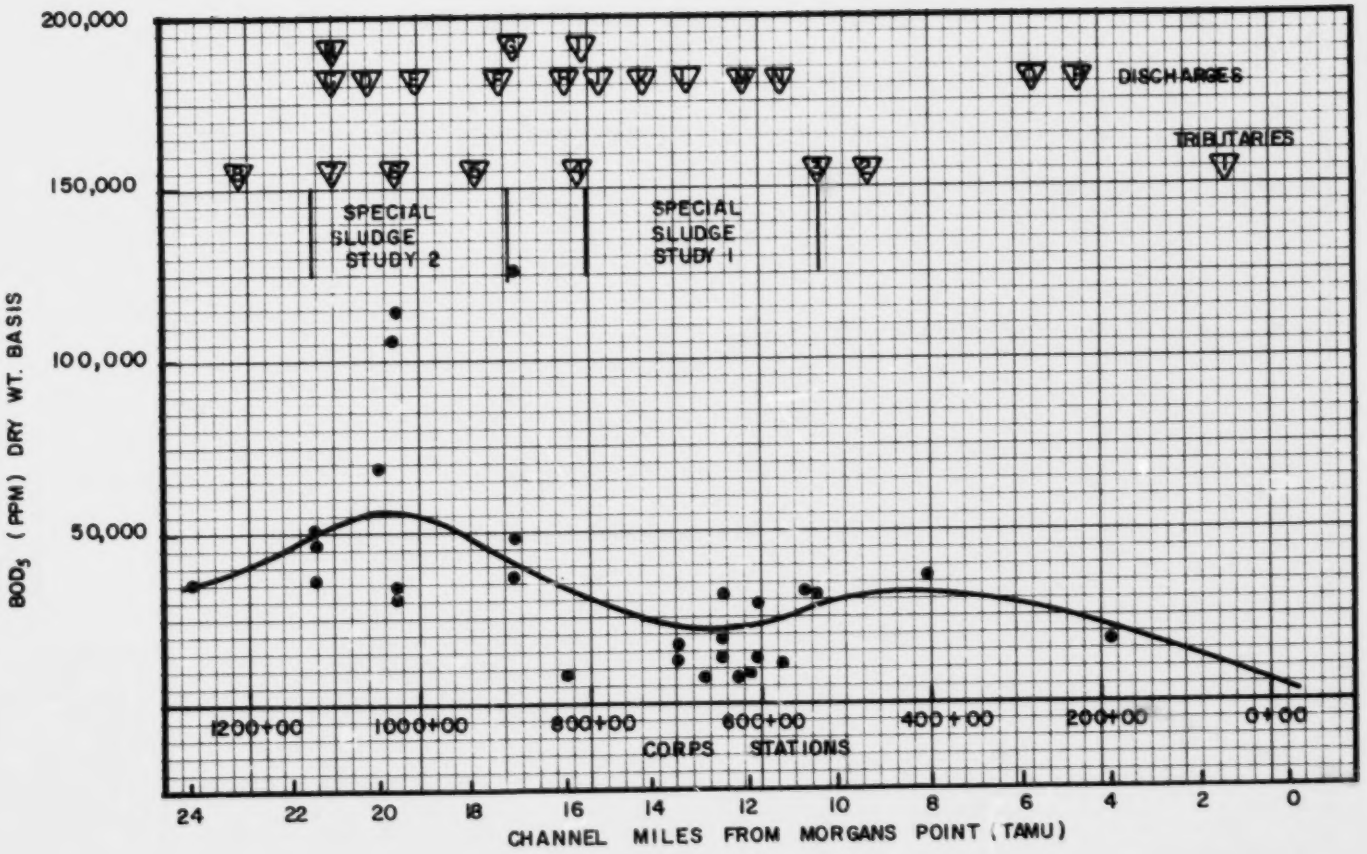

FIGURE VIII-3

BOD_5 PROFILE OF BOTTOM SLUDGES

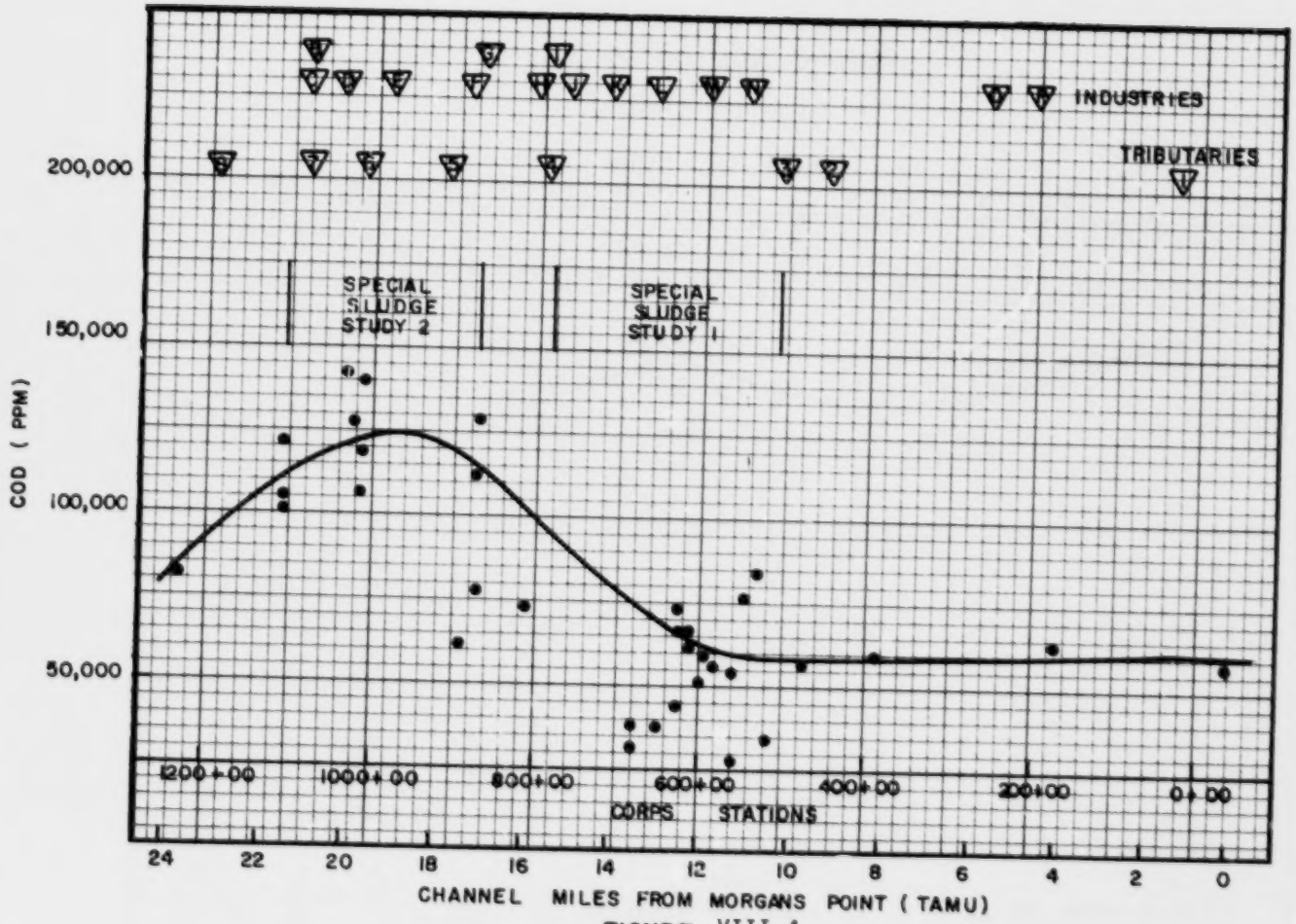

FIGURE VIII-4
COD PROFILE OF BOTTOM SLUDGES

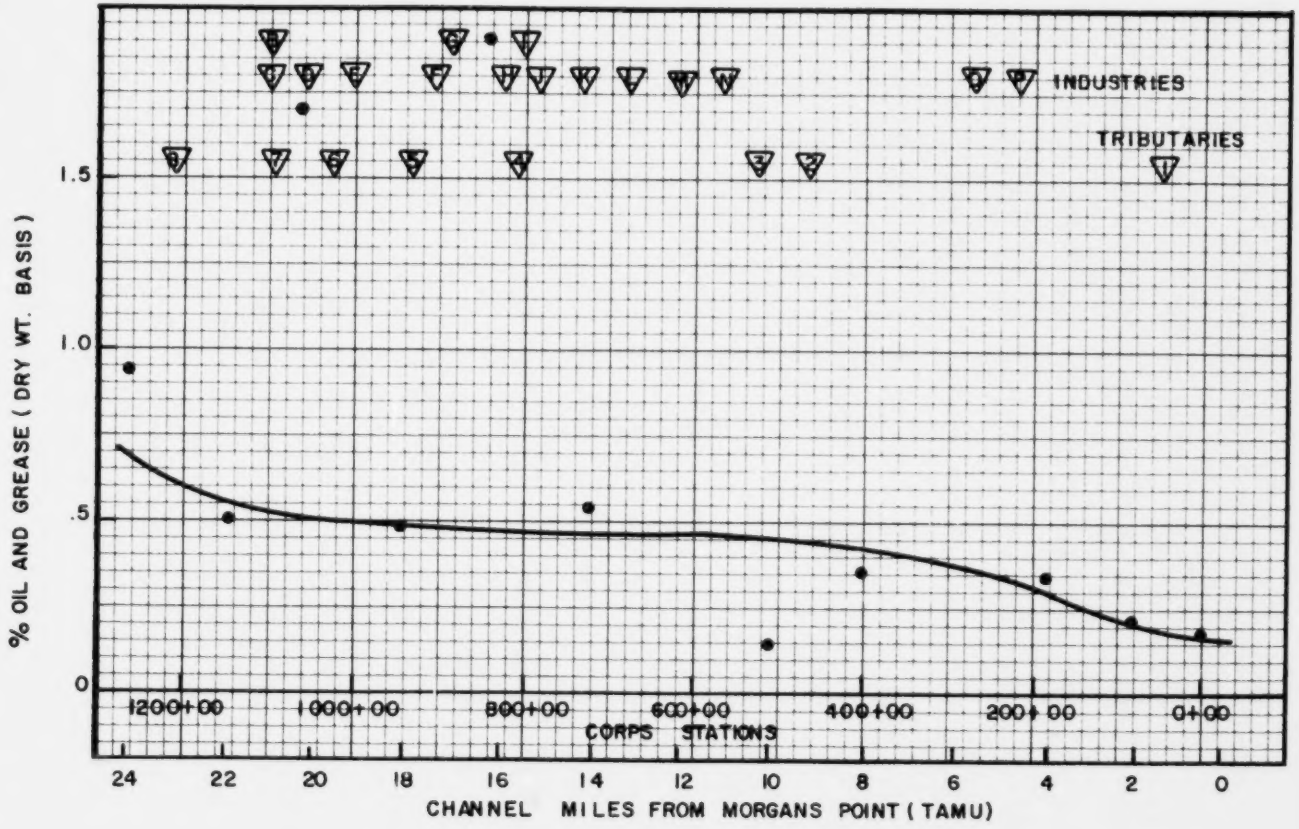

FIGURE VIII-5

PERCENT OIL AND GREASE PROFILE OF BOTTOM SLUDGES

were sampled to determine the effect of sludge deposits on the quality of the waters in the bays. Table 2 lists the BOD_5, COD and volatile solids for a composite sample of the sediments in each bay. Physical descriptions of the core samples are included in the tabulation. Only the sample taken from Scott Bay demonstrates a significant BOD_5. The ratios between BOD_5, COD and volatile solids values found in Scott Bay to those found at adjacent sampling stations in the Ship Channel are 1:3, 1:2 and 1:2 respectively. The presence of significant levels of pollutants in the Scott Bay deposits may be due to the location of Enjay Chemical Company's waste outfall in the bay.

Conclusions

1. The benthal deposits contained in the Houston Ship Channel and its tributary bays represent an important pollutional source.

The deposits located above mile point 12 are of considerably worse quality than those below or of those in the side bays. However, the effect of the side bay sludges on the water quality of those shallow waters may be very important.

2. The BOD analyses indicate the Channel deposits contain materials toxic or inhibitory to microorganisms.

Recommendations

Spoil sites should be located where the dredged material is permanently removed from the Channel and its tributaries. These sites should be adequately diked and protected to prevent runoff from the areas.

Representatives of the U. S. Corps of Engineers and the EPA have proposed the construction of a diked spoil area on Atkinson Island. As proposed, spoil material will be deposited within the diked area until the final elevation of the island reaches 12 feet above MSL. The

TABLE VIII-2 -Side Bay Analytical Data Summary*

Upper San Jacinto Bay

Sample	(ppm) BOD_5	(ppm) COD	(ppm) Volatile Solids	Volatile Fraction %	Description
C	1,560	25,700	25,150	5.7	2'-0" Grey - Black Material on Clay Bottom
B	-	-	-	-	2'-2" Grey - Black Material on Clay Bottom
A	-	-	-	-	2'-0" Grey Sandy Sludge on Sand Bottom

Burnett Bay

C	1,710	23,080	24,030	6.0	5'-3" Black Anaerobic Material, Lighter Color at Bottom
B	-	-	-	-	3'-5" Black at Top, Grey Near Bottom
A	-	-	-	-	4'-2" Anaerobic Material Black at Top Grey Near Bottom

Scott Bay

C	6,240	37,300	29,000	7.3	4'-6" Black at Top, Grey Near Bottom
B		-	-	-	5'-0" Black at Top, Grey Near Bottom
A		-	-	-	4'-5" Black to Grey With Sand

ultimate use of the spoil islands has not been decided, but recreation and wildlife refuge have been mentioned as possible uses. The EPA representative suggested the Texas Water Quality Board and EPA conduct a joint productivity study of the area to determine the environmental impact of the project.

IX

COLOR REMOVAL

1. Recommendation

Chemical constituents causing color in waste effluents, such as those from pulp and paper mills, shall be reduced to natural background in area waters as soon as practicable as stated in existing Texas Water Quality Board waste control orders. A report on feasible processes to accomplish this recommendation shall be submitted to the Conferees within six months of the reconvened session of the Galveston Bay Enforcement Conference.

2. Discussion

Major contributors of colored waste include paper mills, tanneries, textile mills, dye manufacturers and electroplating shops (R-8). Of these, only paper mills are known significant contributors in the geographical area of interest. The brown color in paper mill effluent is related to the lignin in the effluent, and lignin resists biological attack. Only a small part of the BOD of lignin is determined in a five-day test, but a significant long term BOD is reported (R-1)(R-11). For this reason, color in paper mill effluents may be an indicator of oxygen demand, whereas in most cases it is not.

Current Operation

Values of current effluent quality for municipal plant discharges are usually not reported in the literature, but two sources cite colors of 30 and 75 color units (R-10)(R-4). Activated sludge plants can remove more than 90 percent of the influent color but trickling filters are less efficient and primary treatment alone is much less efficient (R-9).

File data on chemical plants records one petrochemical plant effluent as high as 150 color units (R-15). The State of California considers 150 color units as the maximum value for a "good source of domestic water supply (R-5). Since (1) the data available on color in municipal and industrial effluents is sparse, and (2) the data collected reveals relatively low color values, one can conclude that color is usually not a problem where wastewater is subjected to good secondary treatment.

By contrast, current effluent quality for paper mills is in the range of 500-1,000 color units (APHA, Pt-Co), while typical raw blended kraft effluent itself averages about 2,000 (R-16) (R-14) (R-6). Several processes are used to make paper, and the type of process has a significant bearing on the type of waste discharged (R-17). A limited amount of test data on paper plant effluents in the Houston Ship Channel area gives values ranging from 100 to 1080 color units (R-15). Activated sludge secondary treatment units normally remove about 10-15 percent of the color in these effluents, and this unit process is frequently used to treat paper mill discharges (R-17). The relative inefficiency of biological processes in terms of color removal accounts for the high color remaining in the effluents.

Best Practice

Treatment of municipal waste with activated carbon can reduce the color from 30 to 3 units, where it is most likely a candidate for reuse (R-10). Ion exchanging can reduce kraft paper mill bleaching waste from

1500 to 200 Pt-Co units (R-12). Pilot plant data on "massive" lime treatment processes indicate that greater than 90 percent of the color can be removed from raw bleached kraft effluent. A color of 200-400 units could be expected. Carbon columns following in series with lime treatment can further reduce color to less than 30 units. Costs for these treatment steps are relatively high (R-16) (R-3) (R-14).

Background Color in Galveston Bay and Tributaries

On April 17, 1972 a survey was conducted to determine the background color of the Houston Ship Channel, Upper Galveston Bay, and the tributary streams within the estuarine system. Surface to bottom composite samples were collected at each site with the analyses being made by the EPA lab in Houston. All sampling and analyzing procedures were performed according to Standard Methods. The attached table includes the location and color value for each sample. (Table IX-1)

Three samples were obtained in the Houston Ship Channel. The first sample was taken at the confluence of Sim's Bayou and the Channel, above the Champion Paper discharge. The next was taken at Green's Bayou below the Champion discharge. The influence of the Champion discharge (160 APHA units) is apparent. The remaining sample taken at the Monument shows the influence of the Southland Paper discharge (180 APHA units). The average color for Ship Channel water was 42 APHA units for this particular day.

The average color content of the waters in the side bays is 72 units, slightly higher than the Channel. This increase is expected due to the relatively large land - water contact area found in the shallow side bays.

TABLE IX-1

BACKGROUND COLOR SURVEY -
UPPER GALVESTON BAY AND TRIBUTARIES

Sample Location or Description	Apparent Color Units (APHA, Pt-Co)
Houston Ship Channel at Sims' Bayou	30
Champion Paper Effluent Plume	160
Houston Ship Channel at Green's Bayou	46
Southland Paper Effluent Plume	180
Houston Ship Channel at Monument	50
San Jacinto River at IH-10	70
Burnett Bay	100
Scott Bay	65
Tabbs Bay	55
Upper Galveston Bay at Barbour's Cut Channel	65
Trinity Bay between Umbrella Point & Smith Point	48
Galveston Bay between Smith Point & Eagle Point	39
Galveston Bay at Ship Channel Marker #65	33
Galveston Bay at Morgan's Point	44
Cedar Bayou at IH-10	47
Green's Bayou at IH-10	60
Buffalo Bayou at N. Main St. Bridge	32
Bray's Bayou at IH-45	42
Hunting Bayou at IH-10	40
Sims' Bayou at State Highway 225	80

Samples taken in Upper Galveston Bay show an average color of 46 units. The average color found in the streams tributary to the Houston Ship Channel was 50 APHA units. The decrease in color of the Channel water from that found in its tributaries is probably due to dilution by the relatively colorless municipal effluents and the underflow of bay water.

Conclusions

The background color in natural waters is a highly variable quality parameter. The color of unpolluted water can vary from clear to almost black. Color is an aesthetic problem; the extent of the problem is determined by the individual observer.

The color from most municipal and industrial effluents is minimal. The color in paper mill effluent is contributed by tannins and lignins which are found in most naturally colored waters. These compounds represent an oxygen demand in the stream; however, the biological reaction rate is so slow that the stream oxygen resource is not appreciably affected.

The very low reaction rate also makes color removal by biological treatment impractical. Physical-chemical methods for removal of color from paper mill wastes are technically possible but are economically prohibitive at this time.

The background color of the tributary waters of the Galveston Bay system is higher than that found in the Ship Channel. This is true even after the discharge of colored effluents from two large paper mills. The difference between the maximum color found in the Ship Channel and that in Upper Galveston Bay is statistically insignificant.

Recommendations

In an estuarine system such as Galveston Bay, the increase in color contributed by waste discharges is small. Requiring extensive color

IX. COLOR REMOVAL
REFERENCES

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(R-7) Murphy, N.F. and Gregory, D.R., "Removal of Color from Sulfate Pulp Wash Liquors), Proceedings of 19th Industrial Waste Conference, Purdue University, May, 1964, p. 59.

(R-8) Nemerow, Nelson L., "Color and Methods for Color Removal", Proceedings of 11th Industrial Waste Conference, Purdue University, May, 1956, p. 584.

(R-9) Nemerow, N.L. and Doby, T.A., "Color Removal in Waste Water Treatment Plants", Sewage Ind. Wastes 30, 1958, p. 1160.

(R-10) Parkhurst, J.D., Dryden, F.D., McDermott, C.N., English, John, "Pomona Activated Carbon Pilot Plant", J. of WPCF, V. 39, No. 10, Oct., 1967, p. R 70.

(R-11) Raabe, E.W., "Biochemical Oxygen Demand and Degradation of Lignin in Natural Waters", J. of WPCF, V. 40, No. 5, May, 1968, P. R145.

(R-12) Rohm and Haas Company Technical Brochure, "Decolorization of Kraft Pulp Bleaching Effluents Using Amberlite XAD-8 Polymeric Adsorbent", Rohm and Haas, August, 1971, p. 3.

(R-13) Smallwood, C., Jr. and Fortune, D.L., "The Measurement of Color Pollution in Streams", Proceedings of 14th Industrial Waste Conference, Purdue University, May 1959, p. 509.

(R-14) Smith, Donald R. and Berger, Herbert F., "A Chemical-Physical Wastewater Renovation Process for Kraft Pulp and Paper Wastes", J. of WPCF, V. 40, No. 9, Sept., 1968, p. 1575.

(R-15) Texas Water Quality Board Files

(R-16) Thibodeauz, L.J., Smith, D.R. and Berger, H.F., "Wastewater Renovation Possibilities in the Pulp and Paper Industry", Chemical Engineering Progress Symposium Series 90, V. 64, 1968, p. 178.

(R-17) U.S. Department of the Interior, FWPCA, The Cost of Clean Water, Volume III, Industrial Waste Profiles No. 3 - Paper Mills, U.S. Government Printing Office, Washington, D.C., 1967.

(R-18) Wakeley, J.H. and Nemerow, N.L., "Measurement of Objectionable Stream Colors Resulting from Wastes", Proceedings of 13th Industrial Waste Conference, Purdue University, May, 1958, p. 465.

removal in waste effluents using today's technology, will greatly increase treatment costs while resulting in an insignificant improvement in the Bay. The Texas Water Quality Board will require color reduction when technology becomes feasible as specified by existing waste control orders.

X

BOD ALLOCATIONS TO HOUSTON SHIP CHANNEL

1. Recommendation

To meet present official State-Federal water quality standards established for dissolved oxygen in the Houston Ship Channel, it is expected that the maximum waste load discharged from all sources will be about 35,000 pounds per day of five-day BOD, including projected future development. The Texas Water Quality Board, in cooperation with technical personnel of the EPA, shall review existing waste discharge orders with the objective of allocating allowable five-day BOD waste loads for sources discharging to the Houston Ship Channel such that the probable 35,000 pounds per day maximum shall not be exceeded. A report will be made to the Conferees on the results of this review by April 1, 1972. The allocation for each waste source as determined by the Texas Water Quality Board, in cooperation with the EPA, shall be attained by December 31, 1974. Interim dates to determine progress toward compliance of the assigned allocation shall be established for each waste source by May 1, 1972.

The Conferees also recognize that discharge of other waste constituents such as, but not limited to, chemical oxygen demand, suspended solids, complex organics, and other toxic materials also contribute to the

pollution of Galveston Bay and its tributaries. An allocation of allowable waste discharges for these pertinent parameters from each waste source will be established by technical personnel of the Texas Water Quality Board and the EPA consistent with best available treatment practices and such allocation will be reported to the Conferees by September 1, 1972.

The Conferees recognize that technical considerations may require a reassessment of this schedule in the case of some of the municipal and industrial waste sources to be considered. These necessary reassessments will be determined by technical personnel of the Texas Water Quality Board and the EPA, and recommendations concerning schedule changes will be made to the Conferees at six month intervals.

The foregoing recommendations shall not be construed as in any way foreclosing or interfering with Federal, State or local statutory proceedings relating to the authorization, amendment, or revocation of Federal or State waste discharge permits or orders, nor shall such recommendations operate to delay or prevent the creation or operation of regional waste disposal systems such as the contemplated Gulf Coast Waste Disposal Authority.

2. Discussion

A program was undertaken in December 1971 to allocate all permitted BOD discharges into the Houston Ship Channel such that the total load would not exceed 35,000 pounds per day. In developing the BOD allotment, no technical conferences were conducted with the affected entities. The reductions were generally balanced between industrial and municipal discharges. To meet the allowable limits set on BOD and other pollution

parameters; advanced treatment is necessary. The proposed allocation made no allowance for future growth in the area.

Public hearings were held on February 7 and 8, 1972, in Baytown to discuss the revised requirements for municipal effluent. Similar hearings were held on February 9, 10 and 11 to discuss the proposed industrial effluent criteria. The public hearing notices, allocations and related documents are contained in Attachment 4, and Table X-1.

It is acknowledged that the BOD allocation did not take into account the record of progress towards abatement by many of the sources or potential growth in the area and is based upon an equal treatment level for all sources regardless of present abatement practices. The hearings were scheduled in the afternoons and evenings to provide the opportunity for all interested parties to participate. The majority of testimony, however, was offered by the municipal and industrial sources to which these allocations apply. Very little general public participation was manifest. The overwhelming impact of the testimony offered was that the allocations proposed were technologically impractical and economically unfeasible.

As a result of these hearings, Texas Water Quality Board has decided to pursue a program of abatement consistent with the requirements of best practicable control technology currently available as determined by the Texas Water Quality Board and the Environmental Protection Agency. Under this program, waste discharges to the Houston Ship Channel from both municipal and industrial sources will be reduced to less than 60,000 pounds per day by December 1973. During this period, consultations will be held between the Texas Water Quality Board and the Environmental

TABLE X-1

B.O.D. ALLOCATIONS TO HOUSTON SHIP CHANNEL

Industrial Discharges

Name	WCO #	Page	Permitted Discharge (Avg.) Flow MGD	BOD mg/l	BOD lbs/day	Present Discharge (Avg.) Flow MGD	BOD lbs/day	Proposed Discharge (Avg.) Flow MGD	BOD mg/l	BOD lbs/day
Anchor Hocking Glass Corp.	01170	01	0.028	20	< 10	0.062	82	0.028	10	< 10
Armco Steel Corporation	00509	01	0.72	10	60	0.77	32	0.72	10	60
		02	no reg.			no discharge		*		
		04	no reg.			no discharge		*		
		5 & 6	4.80	25	1001	3.47	58	3.47	10	290
		07	no reg.			no discharge		*		
		08	no reg.			no discharge		*		
		91	35.00	11		16.00	100% Cooling water	35.00	no net increase	
		92	0.72	100		0.48	16	0.48	13	52
		10	2.60	100	217	no discharge		no discharge allowed		
		11	2.60	100	217	1.50	2888	injection or incineration		
		12	no reg.			no discharge		*		
		13	no reg.			no discharge		*		
		14	no reg.			no discharge		*		
		15	1.08	25		1.26	21	1.08	10	90
		16	no reg.			no discharge		*		
Ashland Chemical Company	00549	01	1.38	50	575	0.60	200	0.60	20	100
Atlantic Richfield	00392	01	no reg.			0.98	427	*	Process waste to separated & added to # 2 outfall	
		02	7.50	100	6255	4.80	3681	4.8	20	800
		03	no reg.			0.029	<1	*		
		04	no reg.			0.08	7	*		
		05	no reg.			1.57	681	1.57	20	262
		06	0.36	no reg.		0.23	12	0.23	10	20

TABLE X-1 (Cont.)

Industrial Discharges

Name	WCO #	Page	Permitted Discharge (Avg.) Flow MGD	BOD mg/l	BOD lbs/day	Present Discharge (Avg.) Flow MGD	BOD lbs/day	Proposed Discharge (Avg.) Flow MGD	BOD mg/l	BOD lbs/day
Celanese Plastic Company	00544	01	0.425	15	53	0.37	12	0.37	10	30
Charter International Oil	00535	01	2.16	50	900	1.45	1,512	1.45	20	242
		02	0.72	50	300	0.03	<1	0.03	10	<10
Chemical Exchange Processing Co.	00786	01	0.144	100	120	0.025	11	0.025	20	8
Cook Paint & Varnish Company	00427	01	0.08	no reg.		0.25	95	0.25	13	27
Crown Central Petroleum	00574	01	4.00	125	4,170	2.14	2,490	2.14	20	357
		02	0.86	125	897	0.50	261	0.50	20	83
		03		no reg.		no discharge		*		
Diamond Shamrock Corporation	00749	01	0.39	100	325	0.11	45	0.11	20	18
	00305	01	3.80	20	634	2.90	17	3.80	no net increase	
		02	98.00	20	16,346	89.40	373	98.00	no net increase	
		03	42.00	50	17,514	28.88	193	42.00	no net increase	
		04	0.65	30	163	0.003	<10	0.003	20	<10
		05	4.80	20	801	2.44	42	4.80	no net increase	
		06	3.0	no reg.		no discharge		no disch.		
E. I. DuPont de Nemour & Co.	00474	01	8.00	50	3,336	7.00	3,580	7.00	20	1,168
Enjay Chemical Company	00610	01	0.20	90	150	0.14	55	0.14	20	23
Ethyl Corporation	00492	01	3.68	220	6,752	3.32	2,191	3.32	20	554
		02	4.75	no reg.		4.919	205	4.75	no net increase	
		03	8.00	no reg.		6.076	286	8.00	no net increase	

TABLE X-1 (Cont.)

Industrial Discharges

Name	WCO#	Page	Permitted Discharge (Avg.) Flow MGD	BOD mg/l	BOD lbs/day	Present Discharge (Avg.) Flow MGD	BOD lbs/day	Proposed Discharge (Avg.) Flow MGD	BOD mg/l	BOD lbs/da
Goodyear Tire & Rubber Co.	00520	01	1.650	40	550	1.470	131	1.47	10	122
		02	2.50	60	1,251	2.48	331	2.48	13	269
Hess Terminals	00671	01	0.108	100	90	0.057	19	0.057	20	<10
Houston Lighting & Power	01031	01	1.12	10	93	0.79	132	1.12	no net increase	
Hughes Tool Company	01046	01	0.104	20	18	0.104	<10	0.104	10	<10
		02	0.092	20	15	0.092	<10	0.092	10	<10
		03	0.207	10	17	0.207	<10	0.207	10	17
		04	0.587	15	73	0.50	103	0.50	13	54
		05	0.090	no reg.	no reg.	0.090	<10	*		
Humble Oil & Refining	00592	01	no reg.			no discharge		*		
		02	25.00	50	10,425	19.35	3,228	19.35	13	2,098
Ideal Cement Company	00456	01	0.50	30	125	0.40	26	0.40	13	43
		02	0.075	30	19	no discharge		no discharge		
		03	0.030	20	5	no discharge		no discharge		
Lubrizol Corporation	00639	01	1.00	100	834	0.72	155	0.72	20	120
		02	no reg.					*		
Olin Corporation	00649	01	12.700	no reg.		12.112		12.112		
		02	1.490	no reg.		no discharge		1.490		
		03	7.050	no reg.		2.744		2.744		
		04	0.034	20	<10	no discharge		0.034	10	<10
		05	0.450	no reg.		5.459		0.450		
		06	to be assigned	no reg.		0.168				
Pennwalt Chemical Corporation	00445	01	0.20	50	83	0.10	23	0.10	20	17
Petroleum & Mining Division	00635	01	0.72	60	361	1.19	84	0.72	13	78
Petro Tex Chemical Corporation	00587	01	1.00	25	209	0.98	29	1.00	10	84
		02	6.25	100	5,212	4.66	3,134	4.66	20	777
		03	0.90	35	263	0.42	83	0.42	20	70
Phillips Petroleum Company	00815	02	1.900	50	792	2.443	115	1.900	5	79
		03	5.000	no reg.		no report		*		
	00975	01	0.100	2	<10	0.178	<10	0.100	2	<10
	01061	01	0.090	2	<10	0.125	<10	0.090	2	<10
Premier Petrochemical	01045	01	0.15	100	125	0.17	181	0.15	20	25
Reichold Chemical Inc.	00662	01	0.02	100	17	0.045	375	0.02	20	3
Rohm and Haas	00458	01	1.728	100	1,441	2.60	8,542	1.728	20	288
		02	0.072	80	48	0.13	146	0.072	20	12
		03-	Equal to or better than Zone II Req's							

TABLE X-1 (Cont.)

Industrial Discharges

Name	WCO#	Page	Permitted Discharge (Avg.) Flow MGD	BOD mg/l	BOD lbs/day	Present Discharge (Avg.) Flow MGD	BOD lbs/day	Proposed Discharge (Avg.) Flow MGD	BOD mg/l	BOD lbs/day
Shell Chemical Company	00402	01	6.10	100	5,087	5.79	1,076	6.10	13	661
		02	no reg.					*		
Shell Oil Company	00403	01	1.44	10	120	1.47	49	1.44	10	120
		02	0.288	30	72	no discharge		no discharge		
		03	0.144	20	24	0.044	4	0.044	13	5
		04	0.576	10	48	0.72	36	0.58	10	48
		05	no reg.					*		
		06	0.086	10	7	0.062	2	0.086	10	8
		07	0.216	20		0.049	6	0.05	13	5
		08	no reg.					*		
		09	0.266	15	33	0.178	11	0.178	13	19
		10	4.752	30	1,189	4.47	671	4.47	13	485
		11	no reg.					runoff from dredging operations		
		12	2.664	50	1,109	0.55	41	0.55	13	60
Sinclair Koppers Chemical Co.	00393	01	0.55	100	459	0.76	1,134	0.55	20	92
Sinclair Petrochemical Co.	00391	01	2.66	50	1,109	1.88	294	1.88	20	314
Smith A. O. Corporation	00672	01	0.850	50	354	0.267	51	0.267	10	22
SMS Industries, Inc.	01062	01	0.115	50	48	0.114	20	0.114	10	<10
Southland Paper Mills	01160	01	50.00	100	41,700	12.35	2,678	12.35	13	1,339
Stauffer Chemical Company	00541	01	1.13	20	188	0.62	36	0.62	13	67
		02	0.045	20	8	0.019	<10	0.019	10	<10
Stauffer Chemical Company	00542	01	1.00	20	167	1.43	155	1.00	13	108
Tenneco Chemical, Inc.	00002	01	1.00	100	834	0.67	133	0.67	20	112
Texas Instruments	01225	01	0.644	20	107	0.433	24	0.433	10	36
Union Equity Cooperative Exchange	01205	01	0.0015	16	<1	0.31	52	0.0015	13	<1
Upjohn Company, The	00663	01	0.58	150	726	0.94	347	0.58	20	97
United States Gypsum Co.	00353	01	0.50	100	417	0.28	50	0.28	13	30
		03	0.0288	3		no reports	no discharge			
U.S. Industrial Chemical	00534	01	0.90	25	188	1.00	91	0.90	13	98
		02	0.43	40	143	0.17	95	0.17	20	28
U.S. Plywood	00640	01	44.00	50	18,348	37.90	6,323	37.90	13	4,109
		02	no reg.					*		
		03	no reg.					*		

* Storm water runnoff only.

Protection Agency with individual waste dischargers to determine specific waste load allocations and implementation dates by these sources for meeting the recommended 35,000 pounds per day of total five-day BOD discharged to the Houston Ship Channel. The present program of limiting effluents to 60,000 pounds per day is an interim step and is not expected to meet presently approved State-Federal water quality standards in the Houston Ship Channel nor the Conferees' Recommendation Number 13. This program of reduction of wastes to less than 60,000 pounds per day of five-day BOD will represent a reduction of greater than 85 percent from waste loads discharging to the Houston Ship Channel during 1968.

ATTACHMENT NO. 1

TEXAS WATER QUALITY BOARD

ORDER NO. 71-0819-1

AND

ADDENDUM

TEXAS WATER QUALITY BOARD
P. O. Box 13246
Capitol Station
Austin, Texas 78711

ORDER NO. 71-0819-1

AN ORDER of the Texas Water Quality Board ordering and establishing dates for the completion of certain improvement projects and studies pertaining to the sewerage facilities owned by the City of Houston.

PREAMBLE

In order to assure that the effluents being released by the City of Houston, Texas, from its several sewage treatment plants are brought in an orderly and timely fashion into compliance with applicable waste control orders issued by the Texas Water Quality Board and to abate the present pollution of waters within and adjoining the City of Houston, the Texas Water Quality Board has ordered the City of Houston to undertake a sanitary sewerage system improvement program.

The purpose of this order is to clearly set forth some portions of the improvement program which the Texas Water Quality Board has directed the City of Houston to complete and the timetable for the completion of various phases or portions of this program.

The completion dates shown in this order are considered by the Board to be reasonable and proper, and were determined after due consideration had been given to the dates contained in the City of Houston's Waste Treatment Progress Report of August 19, 1971, during a public hearing held by the Board on August 19, 1971.

It is the intent of the Texas Water Quality Board that the City adhere to the dates established and unless the particular phase or portion of the improvement program due for completion is completed on or before the required date, or unless the City has requested and the Board approved for acceptable reason or reasons an extension of the improvement program; the

Board herein places the City of Houston on notice that it intends to seek such relief as may be indicated in the courts. Now, therefore,

BE IT ORDERED BY THE TEXAS WATER QUALITY BOARD:

I. DEFINITIONS FOR THIS ORDER:

A. "Board" means the Texas Water Quality Board.

B. "City" means the City of Houston, Texas.

C. "Executive Director" means the Executive Director of the Texas Water Quality Board.

D. "Staff" means the staff of the Texas Water Quality Board.

II. Report Regarding Project Completion Dates

A report outlining completion dates for the following projects will be submitted to the Board on or before December 1, 1971: (a) abandonment of the unpermitted plant at Western Acres and the sewage treatment plants outlined on pages 8, 14, 21, 22, 25, 41, 45, 46, 47, 49, 55, 58 of the City's Waste Control Order No. 10495, (b) the enlargement of sewage handling facilities at sewage treatment plants covered by pages 15, 16, 30, 43, 44, 65, and 69 of the City's Waste Control Order No. 10495, (c) provide sludge handling and chlorination facilities at the Sims Bayou sewage treatment plant, (d) provide treatment for the waste from the water treatment plant covered by page 68 of the City's Waste Control Order No. 10495. After review and concurrence with these completion dates by the Board, they will become part of this Board Order.

III. Bacteriological Study

In order to determine the efficacy, or lack thereof, of the sanitary sewerage system in abating the bacteriological pollution of the various drainageways within the City, and to identify the source or sources of excessive bacterial pollution; the City Water Pollution

Control Division of the City Health Department is directed to continue and expand its bacteriological water quality sampling program. The sampling points shall be located so as to determine the impact of the various treated effluent discharges and known recurring overflows, and in cooperation with the Texas Water Quality Board's District 7 staff. The data generated by this program shall be forwarded at appropriate regular intervals to the Texas Water Quality Board and appropriate persons in the City Administration, including the Sewer Department.

IV. Report Regarding Chlorination and Suspended Solids

A report outlining (a) the reason or reasons for the lapses in chlorination at the various plants and programmed corrective action, and (b) the capability of the various permanent sewage treatment plants as identified in the City's progress report of August 19, 1971, to comply with suspended solids requirements when fully loaded will be submitted to the Board on or before March 1, 1972.

V. Overflow of Raw Sewage, McGregor Park

The City is directed to take positive action to expedite the project to eliminate the recurring overflow of raw sewage into Brays Bayou adjacent to McGregor Park. A report on the action taken will be submitted on or before March 1, 1972.

VI. Correction of Existing Inadequate Conditions

The City is directed to take immediate action to correct the following conditions (the page numbers refer to Waste Control Order No. 10495)

(1) no flow recorder--Chocolate Bayou plant, p. 9.
(2) inadequate flow measuring device--F.W.S.D. 17, p. 15.
(3) industrial waste problem--F.W.S.D. 17, p. 15.
(4) improperly handled screening--F.W.S.D. 17, p. 15.
(5) no sludge disposal facilities--New Homestead plant, p. 23.
(6) no flow measuring device--Easthaven, p. 65.
(7) inoperative flow recorder--F.W.S.D. 34, p. 69.
(8) inoperative sludge collector and mechanical aerator--W.C.I.D. 44-1, p. 47.
(9) bypass from aeration tank--Airport, p. 78.

A report on the corrections accomplished will be submitted on or before March 1, 1972.

VII. Apply for Waste Control Orders

The City is directed to file with the Texas Water Quality Board appropriate applications or other documents and to take such other actions as may be appropriate to secure valid waste control orders for the sewage treatment facilities listed below. To facilitate the securement of such waste control orders, the City shall consult with the Hearings and Enforcement Division of the Texas Water Quality Board by November 1, 1971 on the documents required and shall submit in an expeditious manner such documents as may be determined.

Expire Page	Name	Expiration Date
8	Chatwood Place	12-31-68
14	Fontaine Place	12-31-66
15	F.W.S.D. 17	6-30-67
21	Gulf Palms	12-31-68
22	Gulfway Terrace	12-31-68
25	Lake Forest	12-31-68
29	Longwoods	6-30-67
44	W.C.I.D. 34	12-31-68
45	W.C.I.D. 39	12-31-66
46	W.C.I.D. 42	12-31-66
47	W.C.I.D. 44-1	12-31-69
49	W.C.I.D. 44-3	12-31-68
--	Western Acres	--
--	W.C.I.D. 82	--

VIII. Sludge Disposal Facilities

The City is directed to submit by December 1, 1971 a report on an analysis of the adequacy and reliability of the sludge disposal facilities at the Northside and Sims Bayou plants. The report should outline alternates available to rectify deficiencies found, if any.

IX. Infiltration Abatement Program

The City is directed to continue and complete its existing infiltration study and abatement program as set forth in the report dated November 16, 1970. Further, the City is directed to submit by May 1 each year a report on the progress made.

X. Funding Sanitary Sewerage System

The City is directed to provide the funding necessary to effectuate the recommendations enumerated in this Board Order.

XI. Long-Range Sanitary Sewerage Planning

The City is directed to keep its long-range sanitary sewerage plan current.

With respect to implementing the long-range plan, the City is directed to exercise the provisions of extraterritorial legislation to accomplish the following:

(1) Insure that alterations which may from time to time be required in the long-range plans of the City and the Houston-Galveston Area Council are fully coordinated in such a manner that the plans remain compatible.

(2) Insure that proposed sanitary sewerage facilities or modifications to such facilities within the extraterritorial jurisdiction area are compatible with the City's long-range plan.

(3) Insure that the design and construction of facilities within the extraterritorial jurisdiction area conform with the minimum requirements of the City.

In the City's comments on applications to the Texas Water Quality Board for waste control orders, the City will furnish to the Board: (1) an analysis showing that the sanitary sewerage facilities proposed are compatible with the regional plan, (2) the City's approval or rejection of the plans and specifications, including arrangements made for construction inspection, for such facilities, and (3) the City's approval of the plumbing code to be required in the area served by the particular entity involved.

XII. EXTENSION OR WAIVER: If at any time it becomes evident to the City that difficulty will be experienced in complying with the completion dates enumerated in this order, the City shall immediately request

by letter addressed to the Board's Austin Office to be placed on the next Board Meeting agenda to request that the completion date or dates be extended or waived. The City shall, upon notification that they have been placed on the agenda, have a representative or representatives attend the Board Meeting to present their reason or reasons for requesting an extension or waiver. The Board will, upon considering the data or evidence presented, determine the acceptability of the reasons, and notify the City in writing that the request for an extension or waiver as the case may be is granted or denied.

XIII. EFFECTIVE DATE: This order is effective immediately upon its adoption by the Board.

XIV. NOTIFICATION PROVISION: The Executive Director is directed to send a copy of this order to the City of Houston, Texas.

XV. SEVERANCE CLAUSE: If any provision, sentence, clause, or phrase of this order is for any reason held to be invalid, such invalid portion shall not affect the validity of the remaining portions of this order. The Board hereby declares that it would have passed the valid portions of this order irrespective of the fact that any one or more portions be declared invalid.

Passed and approved this 19th day of August, 1971

TEXAS WATER QUALITY BOARD

Marion Fulcher

CHAIRMAN

(Seal)

ATTEST:

Hugh C. Yantis, Jr., Executive Director

ADDENDUM TO BOARD ORDER NO. 71-0819-1

Article II of this order requires the City of Houston to submit to the Texas Water Quality Board a report containing completion dates for a number of projects. This report has been received and reviewed by the Board. The Board concurs with the completion dates, which are shown on the following pages, and hereby incorporates them as requirements of this order.

Passed and approved this ____ day of _____, 1972.

TEXAS WATER QUALITY BOARD

_____
GORDON FULCHER, CHAIRMAN

(Seal)

ATTEST:

_____
Hugh C. Yantis, Jr., Executive Director

ADDENDUM TO BOARD ORDER 71-0819-1

Page	Name	Action	Completion Date
	Western Acres	Abandon	03-11-72
8	Chatwood Place	Abandon	12-15-72
25	Lake Forrest	Abandon	12-15-72
14	Fontaine Place	Abandon	08-15-73
45	WCID #39	Abandon	08-15-73
46	WCID #42	Abandon	08-15-73
21	Gulf Palms	Abandon	06-01-74
22	Gulfway Terrace	Abandon	06-01-74
20	WCID #20	Abandon	12-31-74
47	WCID #44-1	Abandon	04-30-73
49	WCID #44-3	Abandon	04-30-73
15	FWSD #17	Enlarge	06-30-73
16	FWSD #23	Enlarge	12-01-72
30	West District	Enlarge	04-30-73
43	WCID #32	Enlarge or Abandon	12-31-74
44	WCID #34	Abandon	12-31-74
65	Easthaven	Enlarge	07-01-74
69	FWSD #34	Enlarge	12-31-72
68	Sims Bayou	Chlorination	12-31-72
68	Sims Bayou	Provide Sludge Facilities	12-31-72
	Water Treatment Plant	Provide Treatment	12-30-74

ATTACHMENT NO. 2

TEXAS WATER QUALITY BOARD

ORDER NO. 69-9A

TEXAS WATER QUALITY BOARD
1108 Lavaca Street
Austin, Texas 78701

ORDER NO. 69-9A

AN ORDER of the Texas Water Quality Board determining that the regional plan, contemplated in Texas Water Quality Board Order No. 69-9, has failed to materialize within a reasonable time period; further determining that the immediate implementation of the advanced waste treatment and other requirements contained in Section 3 (pages 4 and 5) of that Order is necessary to preserve and maintain the quality of water in Clear Lake and to prevent the continued pollution of the lake; ordering all dischargers of domestic wastewaters within the Clear Lake Watershed to comply with the aforementioned requirements within such period of time as is reasonably required but not to exceed two (2) years from the date of the adoption of this Order; ordering that these requirements be made a part of the waste control orders (permits) held by these waste dischargers; and establishing a program for compliance with these requirements.

WHEREAS, under the provisions of Texas Water Quality Board Order No. 69-9, the Board announced:

"That in the event that the plan for the protection of Clear Lake, contemplated in this Order, fails to materialize within reasonable time limitations, the Board will, of necessity, be compelled to consider and seek more stringent permit requirements for each waste discharger in the watershed. These requirements will be determined on a case-by-case basis but generally would include the following quality parameters:

"(a) Five day biochemical oxygen demand and total suspended solids not to exceed 12 mg/l.

"(b) Chlorine residual of 2 mg/l after one hour detention time and as measured by the orthotolodine test or other acceptable test.

"(c) Nutrients in the effluent will be removed as follows: Nitrogen shall not be regulated and phosphorous, in

any form, shall not exceed 1.0 mg/l.

"(d) A fully trained and certified operator will be available to the plant at all times and a satisfactory operation and maintenance program will be required.

"(e) Each discharge will be adequately monitored to insure permit compliance and detect inadequacies of operation. Laboratory services will be made available, by contract or otherwise, to the end that a sampling and analytical program is established to monitor effluent quality on a continuing basis."

WHEREAS, the Board, upon full evaluation of the progress made in achieving the regionalization of sewerage services in the Clear Lake area, finds that, in passage of one year from the date of the adoption of Order 69-9, the planning and the initiation of the construction of the regional waste collection, treatment and disposal system contemplated in that Order has not been successfully accomplished.

WHEREAS, the Board finds that the continued discharge of wastewaters at the presently authorized levels of treatment is causing and will continue to cause the water quality degradation of Clear Lake and jeopardize its further utility as a recreational body of water; and

WHEREAS, the Board finds that, on a long-range basis, the preservation of Clear Lake requires the use of a regional sewer system or systems properly designed according to sound engineering and scientific practices and the Board further finds that its long-standing policy to encourage and foster regional systems will require the following:

(A) Whenever, in the judgment of the Board, it appears that it is technically and economically feasible for any waste discharging entity within the watershed, be it municipal

or industrial, to join into a regional system on an ownership, a contract or other satisfactory basis, the connection or tie-in with the system will be required.

(B) Whenever, in the judgment of the Board, it appears that a local government will construct, operate and administer a regional system in an area and the system is found to be necessary to preserve and maintain the waters in the State, the Board will, pursuant to the provisions of the Texas Water Quality Act, designate the area in need of the system and designate the appropriate local government as the responsible operating entity.

WHEREAS, the Board finds that until such time as a regional sewer system or systems are developed, the immediate implementation of advanced waste treatment requirements is necessary; and

WHEREAS, the Board, in Order 69-9, has previously recognized the fundamentally different nature of industrial wastes as opposed to domestic wastes and has already determined that because the specifics of advanced waste treatment for an industry are not properly amenable to a general order, it will be necessary to review all industrial operations within the watershed on a case-by-case basis and require the equivalent of advanced waste treatment. Now, therefore,

BE IT ORDERED BY THE TEXAS WATER QUALITY BOARD:

1. That all waste dischargers within the Clear Lake Watershed (excluding those discharges that have already been diverted out of the watershed and excluding those dischargers pursuing the acceptable alternatives contained in this Order) are hereby ordered to improve and upgrade their waste treatment facilities and operations in accordance with Section 3

(pages 4 and 5) of Texas Water Quality Board Order No. 69-9.

2. That the advanced waste treatment and other requirements contained in Order 69-9 be and the same are hereby incorporated into and made an operative part of the waste control orders (permits) held by those waste dischargers.

3. That the construction and other work necessary to achieve satisfactory compliance with these new requirements be completed as soon as is reasonably possible but not in excess of two (2) years from the date of the adoption of this Order.

4. That each waste discharging entity within the watershed shall, on or before October 1, 1970, provide the Board with written evidence that it proposes to:

    1. Divert its wastes to some other watershed according to an acceptable plan; or
    2. Combine its wastes with that of some other entity operating a sewerage system; or
    3. Totally contain its wastes so that no discharge will be made; or
    4. Provide tertiary or advanced waste treatment as per this Order.

5. That, in the case of industrial waste dischargers, a similar written document shall be submitted within the same time limitations but that such written evidence shall contain the industry's evaluation of the applicability of the general order to their particular wastewaters and their proposals concerning compliance with the purposes of this Order.

6. That because of the variety of techniques by which advanced waste treatment can be achieved, the specific

requirements for a particular waste discharger may be altered from those shown in Order 69-9 upon a positive demonstration supported by adequate technical evidence that the difference is attributable to the technique employed and not the result of an inferior method of advanced waste treatment and that the technique employed will adequately protect Clear Lake.

7. That all waste dischargers within the purview of this Order shall be required to submit written reports and otherwise comply with the following provisions:

   (A) THOSE ELECTING TO IMPLEMENT ADVANCED WASTE TREATMENT PRACTICES

      1. By December 1, 1970, submit to the Board a written report containing a description of the additional treatment facilities proposed along with appropriate documentation as to the engineering firm or person authorized to proceed with the design of the facilities.
      2. By February 1, 1971, submit written report detailing the proposed fiscal or other programs to be used in constructing and operating the facilities.
      3. By May 1, 1971, submit a complete progress report on all phases of compliance with this Order.
      4. By August 1, 1971, construction of the facilities should commence and a report should be submitted containing the date of the start of construction and the estimated date of completion.
      5. After August 1, 1971, quarterly progress reports shall be submitted and by August 28, 1972, all facilities shall have been completed and in operation.

(B) THOSE ELECTING TO PURSUE DIVERSION OF WASTEWATERS OR OTHER ACCEPTABLE ALTERNATIVES

1. By December 1, 1970, submit a written report containing a description of the specific construction and other arrangements necessary to implement the particular alternative chosen.
2. By February 1, 1971, submit a written report detailing the proposed fiscal or other program to be followed in implementing the alternative.
3. After February 1, 1971, quarterly progress reports shall be submitted until such time as the alternative is fully implemented.

8. That the reports and other written evidence of compliance required by this Order shall be sent to the following address:

Texas Water Quality Board
1108 Lavaca Street
Austin, Texas 78701
ATTN: Field Services

9. That the Field Services Section shall maintain a special file which shall be a complete record of the compliance with these vital reporting provisions and that the Field Services Section shall review each report submitted and keep the Executive Director apprised as to the status of each entity in meeting the provisions of this Order.

10. That the Executive Director be instructed to undertake a program to insure full compliance with this Order, to keep the Board apprised of the status of compliance with the Order, and to seek, in appropriate cases, the fullest possible prosecution of any violations of the terms and

provisions of this Order.

11. That the provisions of this Order shall be applicable to all waste discharges within the Clear Lake Watershed including those waste discharges authorized by Texas Water Quality Board Waste Control Orders issued to the entities listed in Exhibit A of this Order.

Issued this the 28th day of August, 1970.

TEXAS WATER QUALITY BOARD

Gordon Pulcher, Chairman

(Seal)

ATTEST:

Hugh C. Yantis, Jr., Executive Director

ATTACHMENT NO. 3

HOUSTON - GALVESTON AREA COUNCIL

PROPOSED REGIONALIZATION PROGRAM

FOR

WASTE ABATEMENT

GREENS BAYOU AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10962	Cypress-Fairbanks I.S.D.	White Oak Bayou	0.025	0.025	Phase into Regional System between 1975 and 1990.
10876	Harris County FWSD #61	White Oak Bayou	0.100	0.100	Phase into Regional System by 1990.
10962	Cypress-Fairbanks I.S.D.	Greens Bayou	0.064	0.060	Phase into Regional System between 1975 and 1990.
10680	City of Jersey Village	White Oak Bayou	0.066	0.066	Phase into Regional System by 1990.
	White Oak Dev. Co.	White Oak Bayou	0.050	0.019	Phase into Regional System by 1990.
10919	Oak Glen Bldg. Co.	Greens Bayou	0.500	None	Phase into Regional System by 1990.
10699	Mayflower Invest. Co	Halls Bayou	0.500	0.025	Phase into Regional System between 1975 and 1990.
10610	Southern San. Corp.	Halls Bayou	0.350	0.350	Phase into Regional System between 1975 and 1990.

GREENS BAYOU AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
	Trailer Park	Greens Bayou	Unknown	Unknown	Phase into Regional System between 1975 and 1990.
10648	Harris Co. FWSD #45	Greens Bayou	0.053	0.053	Phase into Regional System between 1975 and 1990.
10518	Northern Terrace	Halls Bayou	0.300	0.259	Phase into Regional System between 1975 and 1990.
	No. Houston Ind.	Greens Bayou	Unknown	Unknown	None
10756	Imperial Valley	Greens Bayou	0.300	1.100	Phase into Regional System in 1990 or shortly thereafter.
10809	West Road I.D.	Greens Bayou	0.550	0.100	Phase into Regional System in 1990 or shortly thereafter.
10825	Powell's Nursing Home	Halls Bayou	0.019	0.019	Phase into Regional System between 1975 and 1990.
10419	Durkee Manor	Halls Bayou	0.250	0.122	Phase into Regional System between 1975 and 1990.
10694	Jetero Lumber Co.	Greens Bayou	0.012	0.013	Phase into Regional System by 1975.
10453	Galco Utilities	Halls Bayou	0.108	0.12?	Phase into Regional System in 1975 or shortly thereafter.

GREENS BAYOU AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10953	Aldine ISD	Greens Bayou	0.035	0.035	Phase into Regional System by 1975.
10436	Crest San. Corp.	Greens Bayou	0.075	0.144	Phase into Regional System by 1975.
10495-78	Houston Int. Airport	Greens Bayou	0.200	0.150	None
10236	Oakwilde Water Co.	Halls Bayou	0.245	0.245	Phase into Regional System shortly after 1975.
	Chatwood Pl.	Greens Bayou	1.000	0.500	Phase into Regional System by 1990.
10679	Harris Co. WCID #74	Greens Bayou	0.250	0.250	An additional 0.65 mgd planned for in the near future will make the plant suitable until about 1990.
10785	Sequoia Estates	Greens Bayou	0.400	0.005	Use until about 1990.
10495-14	City of Houston [1]	Halls Bayou	0.280	0.200	Phase into Regional System by 1975.
10495-45	City of Houston [1]	Halls Bayou	0.522	0.522	Phase into Regional System by 1975.
10451	Harris Co. WCID #76	Greens Bayou	0.300	0.260	Phase into Regional System between 1975 and 1990.

GREENS BAYOU AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10737	Harris Co. WCID #69	Greens Bayou	0.565	0.432	Phase into Regional System in 1975 or shortly thereafter.
10336	Eastex Oaks	Greens Bayou	1.000	0.144	Phase into Regional System by 1990.
10495-23	City of Houston	Halls Bayou	1.250	0.867	This plant is being expanded to 5.0 mgd and will serve as Regional Plant.
10495-71	City of Houston	Greens Bayou	0.300	0.168	Phase into Regional System between 1975 and 1990

ANAHUAC-MONT BELVIEU AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10400	City of Belvieu	Cedar Bayou	0.075 mgd	0.1 mgd	Abandoned by 1990.
	Barbers Hill ISD	Cotton Bayou	0.015 mgd	Unknown	None
	Lincoln Cedars Sub-division HHM Corp.	Cedar Bayou	0.0025 mgd	Unknown	Phase out upon completion of regional system.
10990	Cedar Bayou Mobile Home Lakliv Inc.	Horsepen Bayou	0.04 mgd	Unknown	Phase out upon completion of regional system.
11109	R. R. Herrington Sr.	Cotton Bayou	0.012 mgd	Unknown	Phase out upon completion of regional system.
	Dutton & Gray	Cotton Bayou	0.012 mgd	Unknown	Phase out upon completion of regional system.
	Bay Ridge Subdivision	Trinity Bay		Unknown	Phase out upon completion of regional system.

TEXAS CITY - LA MARQUE AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10770	Bay View MUD	Galveston Bay	0.25	0.01	Abandoned by 1990.
10627	Bacliff MUD	Houston Lighting & Power Outfall	1.00	0.12	Abandoned by 1990.
10173-01	Galveston Co. WCID No. 1 STP #1	Dickinson Bayou	1.20	0.50	Expanded to 2.4 mgd before 1980. Replaced by regional plant A before 1990.
10173-02	Galveston Co. WCID No. 1 STP #2	Dickinson Bayou	0.50	0.06	Expanded to 1.0 mgd before 1980. Replaced by regional plant A before 1990.
10375-01	City of Texas City STP No. 1	Moses Lake	5.00	5.00	Expanded to 14.0 mgd, becomes Regional Plant B.
10375-02	City of Texas City STP No.2	Moses Lake	0.80	0.61	Expanded to 1.6 mgd before 1975. Abandoned by 1990.
10410	City of La Marque	Highland Bayou	1.90	1.90	Expanded to 3.0 mgd before 1980. Abandoned by 1990.
10435	Bayou Vista Sub-division	Highland Bayou	0.05	0.04	Abandoned by 1990.

CLEAR LAKE AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10495,79	Houston[1] (SE Plant)	Through ditches to Clear Creek	3.0 mgd	N.A.	Serve as subregional plant; to be completed 1973.
10495,55	Houston[1] (Beverly Hills)	Through ditches to Clear Creek	0.368 mgd	0.40 mgd	Abandon when Houston SE plant is put in operation.
10495,58	Houston[1] (Eastridge)	Through ditches to Clear Creek	0.28 mgd	0.12 mgd	Abandon when Houston SE plant is put in operation.
10522	Harris Co.[1] WCID 81	Turkey Creek, Clear Creek	0.25 mgd	0.25 mgd	Abandon when Houston SE plant is put in operation.
10539	Clear Lake[1] City Water Authority	Horsepen Bayou, Middle Bayou, Mud Lake, Clear Lake	2.25 mgd	1.75 mgd	Serve as subregional plant after advanced treatment modifications completed (probably early 1973)
None	NASA-MSC[1]	Clear Lake	0.31	0.25-0.50 mgd	Abandon after connection is made to CLCWA
None	Pasadena[1] (El Carey)	Clear Lake	Unknown	.04 mgd	Abandon after connection is made to CLCWA

[1] The role for these plants has been firmly established by Board Orders 69-9A and 71-0819-1.

TEXAS CITY - LA MARQUE AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10836-02	Flamingo Isle Corp.	Basford Bayou Tributary Canal	0.20	---	Not yet constructed; replaced by regional plant after 1990.
10836-01	Flamingo Isle Corp.	Basford Bayou Tributary Canal	0.20	None recorded	Replaced by regional plant after 1990.
10690	City of Hitchcock	Basford Bayou	0.50	0.29	Expanded to 1.2 mgd before 1975. Replaced by regional plant before 1990.
10174	Galveston Co. WCID No. 8	Highland Bayou	0.04	0.03	Expanded to 0.50 mgd before 1975. Replaced by regional plant before 1990.
10958	Sun Meadows MUD	Dickinson Bayou	0.01	0.005	Served by Clear Creek Planning Sub.
10861	Safari Mobile Home	Magnolia Bayou (A Dickinson Tributary)	0.007	None recorded	Served by Clear Creek Planning Sub.
10771	Texas City Dike Marina	Galveston Bay	0.0005	None recorded	Serves an isolated area.

ATTACHMENT NO. 4

PUBLIC HEARING NOTICE

ON

PROPOSED B.O.D. ALLOCATIONS

FOR

HOUSTON SHIP CHANNEL

GORDON FULCHER
CHAIRMAN
LESTER CLARK
VICE-CHAIRMAN
J. DOUG TOOLE
HARRY P. BURLEIGH

TEXAS WATER QUALITY BOARD

JAMES U. CROSS
J. E. PEAVY, MD
BYRON TUNNELL
HUGH C. YANTIS, JR.
EXECUTIVE DIRECTOR

314 WEST 11TH STREET 78701
P.O. BOX 13246 CAPITOL STATION 78711
AUSTIN, TEXAS

PH. 475-2651
A.C. 512

RECEIVED
JAN 15 1971

PUBLIC HEARING NOTICE

Pursuant to the recommendations adopted at the recent Galveston Bay Enforcement Conference the pollutant load on the Houston Ship Channel will be lowered such that the aggregate biochemical oxygen demand (BOD) load will not exceed 35,000 lbs. per day in order that approved stream standards will be met. Comparable reductions in other pollutants will also be required.

Therefore, the Texas Water Quality Board will conduct a public hearing to amend all waste control orders for industrial effluents discharged into the Houston Ship Channel and its tributaries (exclusive of the San Jacinto River above the Lake Houston Dam) in order to achieve the above specified BOD loading. These waste control order holders are listed in Table I. The Board will also discuss altering other quality parameters specified in the individual waste control orders including but not necessarily limited to total residue, total suspended solids, volatile suspended solids, settleable matter. chemical oxygen demand (COD), oil and grease, color. heavy metals, toxic compounds, free and floating oil, debris, foaming or frothing material and others. In addition, possible regionalization or combination of waste treatment facilities of both domestic and industrial waste dischargers will be discussed where appropriate.

The public hearings for amending the industrial waste control orders will be held on February 9, 10 and 11 in the Baytown Civic Auditorium, 2407 Market Street, Baytown, Texas. These public hearings will commence at 2:00 p.m. on February 9 and 10 and 8:30 a.m. on February 11. This time schedule has been selected to enable any citizens who desire to participate to attend the public hearings.

The Texas Water Quality Board desires that those persons and entities who will be directly affected by these public hearings be informed of the levels of waste treatment which will be required to meet the established goals. In particular, increases in both capital and operating costs are expected to result from the new

(continued)

requirements of the Board. These public hearings will provide an opportunity for discussion of all aspects of these vital issues.

The public hearings may be continued from time to time and from place to place as necessary to develop the record.

Issued this 13th day of January 1972.

Joe P. Teller, DEPUTY DIRECTOR

Hugh C. Yantis, Jr., Executive Director
Texas Water Quality Board

TABLE I

INDUSTRIAL WASTE CONTROL ORDERS TO BE AMENDED

Name	Waste Control Order Number	Page
Airco Welding Products	00655	01
Air Products & Chemical, Inc.	01280	01
Allied Fence Corp.	01212	01
Anchor Hocking Glass Corp.	01170	01
Aquaness Chemical Div.	00761	01
Ashland Chemical Company	00549	01
Atlantic Richfield	00392	01
"	00392	02
"	00392	03
"	00392	04
"	00392	05
"	00392	06
Baroid Div. Nat Lead Co.	01198	01
"	01198	02
Big Three Welding Co.	00306	01
Brown Oil Tools	00687	01
"	00687	02
"	00687	03

Name	Waste Control Order Number	Page
Cameron Iron Works	00357	01
Cargill Inc.	01247	01
Celanese Plastic Company	00544	01
Charter International Oil	00535	01
"	00535	02
Chemical Exchange Processing Co.	00786	01
Cook Paint & Varnish Co.	00427	01
Crown Central Petroleum	00574	01
"	00574	02
"	00574	03
Diamond Shamrock Corp.	01000	01
Diamond Shamrock Corp.	00749	01
"	00305	01
"	00305	02
"	00305	03
"	00305	04
"	00305	05
"	00305	06
Dresser Industries, Inc.	01262	02
Dresser Magcobar	01211	01
E.I. Dupont de Nemour & Co.	00474	01
Eddy Refining Co.	01018	01

Name	Waste Control Order Number	Page
Enjay Chemical Company	00610	01
Enjay Chemical Company	01215	01
Ethyl Corporation	00492	01
"	00492	02
"	00492	03
General American Transportation	01308	01
"	01308	02
General Portland Cement Co.	00312	01
Gibraltor Galvanizing Co.	01019	01
Goodyear Tire & Rubber Co.	00520	01
"	00520	02
Grief Bros. Cooperage Corp.	01217	01
Groendyke Transport Co.	01057	01
"	01057	02
Gulf Coast Portland Cement	01021	01
Gulf States Asphalt Co., Inc.	01058	01
Helmerick & Payne Inc.	01385	01
Hess Terminals	00671	01
Hooker Chemical Corp.	00733	01
"	00733	02

Name	Waste Control Order Number	Page
Horton & Horton, Inc.	00683	01
"	00684	01
"	00839	01
Houston Lighting & Power Co.	01026	01
"	01027	01
"	01031	01
"	01032	02
"	01032	04
Houston Lighting & Power Co.	01033	01
"	01033	02
"	01033	03
Houston Natural Gas	01286	01
Hughes Tool Company	01046	01
"	01046	02
"	01046	03
"	01046	04
"	01046	05
Ideal Cement Company	00456	01
"	00456	02
"	00456	03
John Mecom & Proler Corp.	01017	01

Name	Waste Control Order Number	Page
Kennecott Copper Corp.	01260	01
Koppers Co., Inc.	01034	01
Lead Products Co. Inc.	01030	01
Lone Star Cement Corp.	00580	01
"	00580	02
Lubrizol Corporation	00639	01
"	00639	02
Merichem Company	00485	01
Missouri Kansas Texas RR	01197	01
Murray Rubber Company	01222	01
National Biscuit Company	01298	01
"	01298	02
"	01298	03
National Supply Division	01036	01
Olin Corporation	00649	01
"	00649	02
"	00649	03
"	00649	04
"	00649	05
"	00649	06
Parker Bros. & Co., Inc.	00668	01
"	00797	01
"	00801	01

Name	Waste Control Order Number	Page
Parker Bros. & Co. Inc.	00806	01
"	00809	01
Pennwalt Chemical Corporation	00587	01
Petro Tex Chemical Corp	00587	01
"	00587	02
"	00587	03
Petrochemical Investment Corp.	01301	01
Petroleum & Mining Division	00635	01
Petrolite Corporation	00347	01
Philip Capey Mfg. Co.	00660	01
Phillip Petroleum Company	00815	02
"	00815	03
"	00975	01
"	01061	01
Phosphate Chemical Inc.	01194	01
"	01194	02
Plastic Applicators, Inc.	01150	01
PPG Industries Inc.	01224	01
"	01224	02
Premier Petrochemical	01045	01
Reddy Ice Div.	01279	01
Reichold Chemical Inc.	00662	01
Rohm and Haas	00458	01

Name	Waste Control Order Number	Page
Rohm and Haas	00458	02
"	00458	03
Rollins-Purle Inc	01429	01
Sand & R Oil Co.	01063	01
Shell Chemical Company	00402	01
"	00402	02
Shell Oil Company	00403	01
"	00403	02
"	00403	03
"	00403	04
"	00403	05
"	00403	06
"	00403	07
"	00403	08
"	00403	09
"	00403	10
"	00403	11
"	00403	12
Sinclair Koppers Chemical Co.	00393	01
Sinclair Petrochemical Co.	00391	01
Smith A.O. Corp.	00672	01
Smith Industries, Inc.	00686	01

Name	Waste Control Order Number	Page
SMS Industries Inc.	01062	01
Southern Pacific Co.	01180	01
"	01181	01
Southland Paper Mills	01160	01
Southland Paper Mills, Inc.	01161	01
Southwest Chem. & Plastic Co.	01229	01
Stran Steel Corp.	01259	01
Stauffer Chemical Co.	00541	01
"	00541	02
Stauffer Chemical Co.	00542	01
Superior Oil Company	01232	01
Swift Agricultural Chem. Corp.	01421	01
Tenneco Chemical, Inc.	00002	01
Tenneco Oil Company	00440	01
Texaco, Inc.	00413	01
"	00413	02
"	00413	03
"	00413	04
"	01172	02
Texas Instruments	01225	01
Todd Shipyards	01159	01

Name	Waste Control Order Number	Page
Tube Associates Inc.	01423	01
Union Carbide & Chemical Co.	01173	01
Union Equity Cooperative Exchange	01205	01
United States Gypsum Company	00353	01
"	00353	03
Upjohn Company, The	00663	01
U.S. Industrial Chemical	00534	01
U.S. Industrial Chemical	00534	02
U.S. Plywood	00640	01
"	00640	02
"	00640	03
Uvalde Rock Asphalt Co.	00785	01
Zavalla Sand Company	00545	01

GORDON FULCHER
Chairman
LESTER CLARK
Vice-Chairman
J. DOUG TOOLE
HARRY P. BURLEIGH

TEXAS WATER QUALITY BOARD

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BYRON TUNNELL
HUGH C. YANTIS, JR.
Executive Director

PH. 475-2651
A.C. 512

314 WEST 11TH STREET 78701
P.O. BOX 13246 CAPITOL STATION 78711
AUSTIN, TEXAS

January 17, 1972

F:DW

To the Holder of Waste Control Order No.

Gentlemen:

In accord with the enclosed notice, a public hearing will be held with the objective of lowering the authorized 5-day BOD load on the Houston Ship Channel to 35,000 lbs. per day and to also require reductions in other pollution parameters. It is our intention to require, insofar as possible, a comparable effort by all of the industrial waste dischargers in the area covered by the notice. We have attempted to define the effluent quality for each waste control order holder on the Houston Ship Channel pursuant to this objective. It must be recognized that the waste load allotment to the various individual waste control order holders is as yet imperfect, and that the individual allotments may and undoubtedly will be altered as additional data is developed during the course of the hearing and/or subsequent conferences. Consequently, the attached table showing the effluent requirements for the various industries is being furnished to you to indicate the magnitude of the necessary waste treatment effort, and to assist you in preparing for the hearing.

You should come to the hearing prepared insofar as possible, to discuss fully your company's capability to comply with the proposed effluent quality, and the date by which compliance can be attained--bearing in mind the December 31, 1974 deadline imposed by the findings of the EPA Shellfish Enforcement Conference. The testimony relating to time requirements should be broken into sections with time intervals or interim dates for the accomplishment of engineering, financing, and construction specified.

It is recognized that minimizing the number, within limit, of waste treatment facilities by the creation of regional or subregional waste disposal systems is a desirable goal and this is recognized in the recommendations of the EPA Shellfish Enforcement Conference. In view of the necessity of maintaining the BOD load below 35,000 lbs. per day now and in the future, the treatment levels required to maintain this requirement dictate that advance waste treatment practices be employed. This factor lends additional weight to the desirability of regional or subregional systems. Minimizing the number of treatment facilities, particularly if owned and operated by one entity such as the Gulf Coast Waste Disposal Authority, will enhance the ability to provide for future industrial and municipal growth and remain with the specified 35,000 lbs. per day. For these reasons, we would suggest that you give very serious and immediate consideration to participation in a regional system.

Very truly yours,

Joe P. Teller

for

Hugh C. Yantis, Jr.
Executive Director

ccs: W. A. Quebedeaux, Jr., Ph.D., Director
Harris County Pollution Control Department
L. D. Farragut, M.D., Director
Harris County Health Department
The Honorable Jim Clark
Texas House of Representatives
Honorable Bill Elliott
Harris County Judge
Mr. Joe Resweber
Harris County Attorney
Mr. Jamie H. Bray
Commissioner - Precinct 2
Mr. L. Jack Davis, General Manager
Gulf Coast Waste Disposal Authority
Texas Water Quality Board District 7

GPO 845-370